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OPPORTUNITY TO TRY THE MATRICULATION PROGRAM
IN ALBERTA SCHOOLS

by



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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Opportunity to Try the Matriculation Program in Alberta Schools" submitted by Henry Robert Golan in partial fulfilment of the requirements for the Degree of Master of Education.

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ABSTRACT

The problem in this study was to ascertain whether Alberta schools were uniform in the provision of opportunity to try the matriculation program, or whether, because of differing school characteristics and differing principals' selection practices, the standards set for matriculation entrance differed from school to school.

Data from the survey of principals' selection practices and additional data from the Department of Education reflecting actual selection practices were analyzed by means of chi-square and analysis of variance tests in order to determine whether there were any significant relationships between variations in nine hypothetical predictors and variations in the actual predictors of principals' selection practices. The hypothetical predictors were: school characteristics; principals' consideration for students' and parents' requests regarding choice of programs; principals' concern over school percentage pass; principals' suggested minimum standards; and, the level of Scholastic Ability in the schools. The actual predictors were school Grade IX Aggregate Achievement stanine score means of pupils on the matriculation program in Grade X.

Four statistical procedures, chi-square, correlations, step-wise regression, and analysis of variance, were used. The chi-square test was used to determine which factors, namely, school size, school setting, availability of alternate programs, principals' consideration for students' and parents' request regarding choice of program and principals' concern over percentage pass in their schools, were significantly related to variations in the stanine scores principals suggested as minimum requirements for matriculation entrance. By means of

correlations it was determined if there were any significant relationships among stanine score means in the three Grade IX subject categories, namely, Aggregate Achievement, Mathematics and Science, and Scholastic Ability.

By means of step-wise regression it was determined if there were any significant relationships between variations in the nine hypothetical predictors and variations in school Grade IX Aggregate Achievement stanine score means of students on the matriculation program in Grade X. Finally, by means of analysis of variance the relationships between variations in principals' suggested standards and variations in school Aggregate Achievement stanine score means in the presence of other significant variables were tested.

Analysis of the Departmental records data revealed that there were significant variations in the provision of opportunity to try the matriculation program in Alberta schools. Of the nine hypothetical predictors tested, variations in two, the level of scholastic ability in the schools and standards reported by the principals, contributed significantly to variations in school Grade IX Aggregate Achievement stanine score means of students on the matriculation program in Grade X.

Opportunity to try the matriculation program appeared to vary from school to school in Alberta due to the differing standards set by principals as requirements for matriculation entrance and due to differences in the Scholastic Ability Test stanine scores of the students. Alberta students aspiring to enter the matriculation program are more likely to have this opportunity if they obtain an aggregate stanine rating of six or higher in Grade IX.

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CHAPTER I

INTRODUCTION

In the past two decades Albertan society has changed from one which was largely rural and agricultural to one which is more urban and industrial. Advances in industrial technology have caused increased needs for skilled and professional labor. In the face of a growing shortage of trained technicians and professionals the question arises whether these shortages are caused only by the lack of individuals with the required talent, interest and initiative, or whether a highly selective policy in our schools eliminates students, who eventually could be successful in such careers, from programs that provide the prerequisite training.¹ This study, therefore, is an investigation of principals' selection policies and selection practices in Alberta schools.

I. NEED FOR THE STUDY

The increased emphasis on the importance of education to economic growth, prosperity and the survival of a technological and rapidly changing society has led to an increased emphasis on the need to provide the greatest possible educational opportunity for all.²

¹F.D. Miller, "Public Relations in Business and Industry. Implications for Education," School Community Relations: Projects in Canadian School Administration (University of Alberta, 1963), p. 41.

²Ibid., p. 1.

These developments have focused on a number of aspects of administrative policy. One of these, with the advent of vocational education, is an increasing need on the part of the school to assess carefully the abilities and potentialities of the students before they are selected for the various tracks or streams in our high schools.³

One of the bases of talent identification is the belief that is held in the existence of innate differences in abilities among individuals. This simply implies that some individuals possess more ability for some particular skill than others. Therefore it is important that individuals are placed in positions in society that correspond to their capabilities. On the other hand there is an increasing volume of literature that concerns itself with psychological, sociological, and organizational factors that affect student ability and performance and which tends to negate the theories that we can determine to any degree of accuracy the innate ability and future performance for any individual. As Goslin points out:

. . . one may take the position that manpower development and allocation is essentially a question of discovering which individuals have innate capacity to perform the necessary tasks including the learning of necessary skills along the way, or one may conclude that the contribution of innate factors to the total resulting variance in manifest ability is relatively small, and therefore, while not neglecting the part played by innate ability entirely, we could concentrate our efforts on making the environment in which the individuals develop more fertile.⁴

³D.A. Goslin, The School in Contemporary Society (Chicago: Scott Foresman & Co., 1965), p. 117.

⁴Ibid., p. 114.

A rapidly changing and technologically advancing society demands not only a constant supply of highly trained people but also a means of ensuring that each member of the society finds a position for which he is best suited. Because our schools in part assume the responsibility of selecting students for the various programs at the high school level, the student is very much at the mercy of the educational system for correct evaluation of his capabilities and for his placement in a program that will eventually influence his career opportunities. From the standpoint of society and the individual it is of critical importance that the school do the best job possible in this regard.

II. STATEMENT OF THE PROBLEM

The emphasis on quality education, higher standards, and demand for university graduates has resulted in greater public pressure on school administrators to turn out more matriculants, to raise standards, and to evaluate their systems. Not infrequently schools have been judged on the number of students that complete the matriculation program.⁵ The percentage of students that pass in this program in one school has been compared to that in other schools, or to the provincial average. Parents also have been concerned about the equality of opportunity that is given to students to try the matriculation program.⁶ Principals, as a result of these pressures, have found themselves in a difficult position.⁷

⁵ Edmonton Journal, January 6, 1967, p.33.

⁶ Ibid., p. 33.

⁷ F. McKinnon, The Politics of Education (Toronto: University of Toronto Press, 1960), p. 74.

If principals are too highly selective, choosing only those students who according to past performance seem to have a reasonable chance of being successful, they fail to provide opportunity for many students who do not measure up to the high standards set for eligibility.

On the other hand, the principals who emphasize consideration for students who by past performance seem to have limited chance of success in the matriculation program take the risk of increasing the numbers that will fail in their schools. If the school is compared to other schools and to the provincial average on the basis of the percentage of students who pass the matriculation program, the principal who admits marginal students takes the risk of promoting a larger number of potential failures in his school and consequently of obtaining a lower passing percentage rating.

The question that can be asked is where do Alberta principals stand? Are they highly selective, or are they more considerate of the students' wishes? Or, does the selection policy vary depending upon administrative views held in each school and does the opportunity to try the matriculation program also vary from school to school?

III. THE NULL HYPOTHESIS

Since principals may be influenced by conflicting evidence regarding validity of test scores as predictors of students' success in high school grades it was hypothesized that opportunity to try the matriculation program as reflected by the standards set by principals differed significantly. The null form of this hypothesis adopted for the study

was that opportunity to try the matriculation program does not differ significantly from school to school in Alberta.

IV. SUB-PROBLEMS

A consideration of the problem required an investigation of the following sub-problems:

1. Which grade nine subject stanine scores are used in the selection of students for the matriculation program?
2. What do principals consider as the minimum stanine score a student must have in order to be eligible to try the program?
3. To what extent do principals consider the wishes of the student when the student's stanine score is lower than the selected standard?
4. To what extent do principals consider the wishes of the parents when the student's score is lower than the selected standard?
5. How is school size related to the opportunity to try the matriculation program?
6. To what extent is the principal concerned over percentage pass rating of his school in his choice of students for the matriculation program?
7. Are there urban-rural differences in the selection practices of schools for the matriculation program?
8. Does opportunity to try the matriculation program differ in schools that have enough students to offer matriculation and other alternate programs?

V. ASSUMPTIONS

1. The basic assumption was that it is possible to gather information from principals that would be representative of what they actually do in the selection of students for the matriculation program.

2. It was assumed that the questionnaire used to collect data for the survey was adequate for the purpose of the study.

3. It was assumed that ability and achievement are randomly distributed in the population.

4. It was assumed that the records of the Department of Education are a complete and accurate source of information.

VI. DELIMITATIONS

This study was limited to a survey of the criteria used by principals to select students for the matriculation program, and to a statistical analysis of a number of the measurable criteria, in order to try to determine if there were any variations in Alberta schools in their provision of opportunity to try the matriculation program. The measurable criteria used were the grade nine stanine scores in the grade nine subjects principals reported to be most extensively used as predictors of matriculant success. The students in the sample were those students that were enrolled in the matriculation program in grade ten for the 1966-67 school term. Transfers and dropouts were not considered. Schools in the sample were those from which a questionnaire reply was received. This study was limited to the 1966-67 school year and the stanine scores of pupils who wrote the Grade Nine Departmental Examinations in June 1966.

VII. LIMITATIONS

Many factors that may influence the principals' decisions about which students should be permitted to try the matriculation program were not included in this study due to the difficulty of obtaining relevant data.

VIII. DEFINITION OF TERMS

Evaluation. The process of ascertaining whether a student may be successful in a particular program of study.

Matriculation Entrance. The selection of pupils for the matriculation program in Grade X on the basis of certain criteria related to the completion of Grade IX.

Stanine Score. The final mark in a course assigned to the student in grade nine as reported by the Department of Education of the list of grade nine marks sent to the principal of the school.

Aggregate Achievement Stanine Score. A rating on the total achievement in all grade nine courses for a particular student, as reported by the Department.

Principal's Consideration. The degree to which the principal took into account student's and parent's requests regarding choice of program by the student.

Percentage Pass. The per cent of the students in the matriculation program in a school who get fifty per cent or more in each of their grade twelve university entrance subjects.

The Actual Predictors. The actual predictors of variations in the provision of opportunity to try the matriculation program in Alberta schools were variations in school Grade IX Aggregate Achievement, Mathematics, and Scholastic Ability stanine score means of pupils on the matriculation program in Grade X for the year 1966-67.

Hypothetical Predictors. The hypothetical predictors were numerical measures of some of the factors that accounted for variations in school means of Aggregate Achievement stanine scores. School size, school setting, availability of alternate programs, stanine scores accepted by principals as a minimum standard for entrance into the matriculation program, the degree the principals considered the wishes of the students and the parents regarding choice of program, the degree the principals were concerned over the percentage of students passing into Grade twelve, and the Verbal and Quantitative intelligence of the pupils in the school, were the hypothetical factors tested to determine whether they contributed to the variance in the actual predictor.

IX. ORGANIZATION OF THE THESIS

The second chapter of the thesis includes a review of the related literature in two main areas: (1) studies that validate test scores as good predictors of achievement and ability; and, (2) studies that provide

evidence of psychological and sociological factors that affect achievement and ability scores. The third chapter describes the method of the study, that is, the collection and treatment of data. Chapter IV reports the results of the survey in tables and chi-square values showing the relationships between school characteristics and selection practices. The presentation and interpretation of the results of statistical tests applied to the data from the questionnaires and data from the Department is found in Chapter V. Finally, Chapter VI includes the conclusions and implications of the study.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

The nature of our education system requires the evaluation and assessment of students. The problem of pupil evaluation has been a subject of much inquiry. There is a great volume of literature dealing with what are claimed to be good predictors of high school and university success on the one hand, and another mass of literature that cautions against placing too much emphasis on test scores that evaluate the complex characteristics of a human being.

I. TEST SCORES AS PREDICTORS OF ACHIEVEMENT AND ABILITY

The validity of Grade IX and Grade XII Departmental test scores in predicting performance in high school and the university has been studied in Alberta by Black and Ulmer,¹ Moysa,² Evans,³ and MacInnis⁴.

¹D.B. Black and Harold Ulmer, "The Value of the Grade IX Departmental Examinations in Predicting Success at the Grade XII Level" (unpublished Master's thesis, University of Alberta, Edmonton, 1950).

²W. Moysa, "A Study of the Comparative Value of Prediction Tests Administered in the University High School" (unpublished Master's thesis, University of Alberta, Edmonton, 1953).

³K.L. Evans, "The Academic History of the 1945 Grade IX Class in Their Subsequent High School Careers" (unpublished Master's thesis, University of Alberta, Edmonton, 1953).

⁴M.J. MacInnis, "The Guidance Value of the Grade IX Departmental Scores and Other Selected Factors in Relation to Matriculation of Composite High School Students" (unpublished Master's thesis, University of Alberta, 1958).

An intensive study was completed for the Alberta Royal Commission on Education by MacArthur and Hunka.⁵

The most conclusive of these studies were done by Black.^{6,7}

One of his conclusions, of importance to this study, is that Grade IX examinations scores have a double role in Alberta schools.

. . . They are used first to determine who will pass into Grade X and are second of stated value for high school guidance programs. . . In this latter regard it is a known practice in most Alberta high schools for principals to assign students to given high school programs and to limit their choice of courses on the basis of these Grade IX Departmental scores.⁸

Black further pointed out that the high school program a student attempts is of direct importance to his ultimate vocational objectives, and that the decisions made for the student when he enters grade ten will directly reflect and influence his future educational aspirations. From his studies of Grade IX Departmental scores and their relationship with university success, Black concluded that "it is possible to predict success in related university freshman courses on the basis of Grade IX

⁵ Report of the Royal Commission on Education in Alberta (Edmonton: Queen's Printer 1959), p. 343.

⁶ D.B. Black, "The Prediction of University Freshman Success Using Grade IX Departmental Examination Scores, " Alberta Journal of Education Research, 5:229, December, 1959.

⁷ D.B. Black, "A Study of the Relationship of the Grade IX Principal's Rating to Performance on the Alberta Grade IX Departmental Examinations," Alberta Journal of Education Research, 4:227, December, 1958.

⁸ D.B. Black, "The Prediction of University Freshman Success Using Grade IX Departmental Examination Scores," op. cit., p. 229.

results with a sufficient degree of accuracy that such predictors could be of real value in the guidance program in the early high school years."⁹ He worked out a profile which he thought would be useful as a guide to principals when they assist students in planning their high school programs.

Many other studies in Alberta and abroad have been concerned with the same problem. Most of these have tried to show a relationship between high school grades and university success, and are of interest in this study only to qualify that test scores, or previous achievement, are relied upon as predictors of future success. Knowles reported that summaries of predictive research findings were compiled by Travers, Garret, and Henry.¹⁰ Travers found that high school averages were consistently the best predictors of university success.¹¹ Garret, after reviewing hundreds of U.S. studies found that the correlation coefficient of high school averages with university averages ranged from .29 to .82.¹² Henry (Toronto) also confirmed these findings.¹³

⁹Ibid., p. 234.

¹⁰D.W. Knowles, "Problems of Admissions, "Alberta Journal of Educational Research, 1:3, March, 1965.

¹¹Ibid., p. 3.

¹²Ibid., p. 3.

¹³Ibid., p. 4.

Wesman and Bennet (New York) found that simple addition of verbal ability, numerical, and information scores on the college qualifications test were valid in predicting grade point averages.¹⁴ Moysa,¹⁵ MacInnis,¹⁶ and Evans¹⁷ found that Alberta grade nine and high school achievement scores have positive correlation with future success in high school and university.

Newland (Alberta) studied factors related to success or failure in school and found that the "potential ability in an individual was the most important factor related to high school success".¹⁸ On the other hand Ross and Hooks (U.S.A.) reported that "it must be granted that intelligence test scores have shown up disappointingly both in regard to validity and reliability, and that "character or personality ratings by teachers, achievement tests, or previous school records afford the best basis of prediction."¹⁹

¹⁴ A.C. Wesman and G. K. Bennet, "Simple Addition of Scores in Prediction of College Grades," Educational and Psychological Measurement, 19:243, 1959.

¹⁵ Moysa, op. cit.

¹⁶ MacInnis, op. cit.

¹⁷ Evans, op. cit.

¹⁸ E.F. Newland, "A Study of the Factors Relating to High School Success or Failure" (unpublished Master's thesis, University of Alberta, May, 1933), p. 21.

¹⁹ C.C. Ross and N.T. Hooks, "How Shall We Predict High School Achievement?" Journal of Educational Research, 22:195, 1930, p. 195.

Other studies have been done on the predictive value of test batteries such as Scholastic Aptitude, Tests of Basic Skills, and Differential Aptitude test scores. Boulton in Chicago, using the Terman McNamar (Mental Ability), the Iowa Test of Basic Skills, and the Iowa Every Pupil Test of Basic Arithmetic, concluded that a "battery of tests had value for differential prognosis."²⁰ Further studies by Doplet, Seashore, and Odgers,²¹ Motto,²² Swanson,²³ Lewis,²⁴ Morris,²⁵ Nemzek,²⁶ and Wagner²⁷ seem to uphold the predictive value of test scores.

²⁰ F.B. Bolton, "Value of Vocational Aptitude Tests Battery for Predicting High School Achievement," Personnel and Guidance Journal, 42:23, Nov., 1963.

²¹ J.E. Doplet, H.G. Seashore, and Odgers, "Validation of the Differential Aptitude Tests for Auto Mechanics and Machine Shop Students," Personnel and Guidance Journal, 42:248-655, May, 1959.

²² J.J. Motte, "Interest Scores in Predicting Success in Vocational School Programs," Personnel and Guidance Journal, 673-476, May, 1959.

²³ E.D. Swanson, "Predicting High School Success in Technical College," Educational and Psychological Measurement, 16:1001-1010, 1961.

²⁴ J.W. Lewis, "Utilizing the Stepwise Multiple Regression Procedure in Selecting Predictor Variables by Sex Group," Educational and Psychological Measurement, 22:401, 1962.

²⁵ W.R. Morris, "Realism of Educational and Vocational Choices at Grade Nine," Alberta Journal of Educational Research, 8:103-110, June, 1962.

²⁶ C.L. Nemzek and J.H. Heus, "The Prediction of Academic and Non-Academic Marks in Junior High School, University of Detroit, Michigan," School and Society, 50:672, 1954.

²⁷ W.P. Wagner, "An Evaluation of Selected Tests as Predictors of Success in Industrial Arts" (unpublished Master's thesis, University of Alberta, Edmonton, 1951).

II. FACTORS AFFECTING ACHIEVEMENT AND ABILITY SCORES

Psychological Factors

Many writers support a many-factor approach to intelligence and achievement testing. They agree that innate ability and different predispositions toward achievement exist, but, because of the great many variables involved, evaluation cannot be done to a degree of accuracy that would justify labelling individual students as being suited for one field of endeavor and not another. Some of these factors are relevant to this topic.

Maslow pointed out that in every individual there is an "innate desire or urge for the fulfillment of a hierarchy of needs, thus individuals tend to seek need gratification."²⁸ He claimed that there is conflict between the needs of the individual and those of the organization resulting in alienation and frustration. A further explanation of this conflict was presented by Argyris. He described developmental trends of human beings in our culture as follows:

1. from a state of passivity as infants to a state of increasing activity as adults,
2. from a state of dependence upon others as infants to a state of relative independence as adults,
3. from being capable of behaving in few ways as infants to being able to behave in many ways as adults,
4. from having erratic, shallow behavior, quickly dropped interests as an infant to having deeper interests as an adult,

²⁸ A. H. Maslow, Motivation and Personality (New York: Harper and Brothers, 1954), p. 76.

5. from having short time perspective as an infant to much longer time perspective as an adult,
6. from being in a subordinate position in the family and society as an infant to aspiring to occupy an equal or superordinate position relative to his peers,
7. from a lack of awareness of self as an infant to an awareness of and control over self as an adult.²⁹

According to Argyris individuals in organizations are expected to be passive, dependent, subordinate, and are expected to have short time perspective. Such demands are more congruent with the needs of infants than adults. Argyris claimed that individuals adjust to such organizational pressures by learning defence mechanisms, or by becoming apathetic and disinterested.

Another psychological factor that affects achievement is the lack of curiosity and the presence of monotony in the organization. It seems that organisms have an innate desire to explore the new in the environment. Piaget explained this as a process of assimilation and accommodation. He claimed this arises from the "intrinsic need for cognitive organs or structures once generated by functioning to perpetuate themselves by more functioning."³⁰ Goldstein called this the exploration function and Pavlov named this "the what is it reflex."³¹

²⁹ C. Argyris, Personality and the Organization (New York: Harper and Row, 1957), p. 50.

³⁰ J. H. Flavell, The Developmental Psychology of Jean Piaget (Princeton, N.J.: D. Van Nostrand Co. Inc., 1963), p. 78.

³¹ D. Rechlingshafer, Motivation as Related to Personality (New York: McGraw-Hill Book Co., 1963), p. 52.

In experiments performed in relation to the curiosity factor it was found that organisms like stimulus change and that there is strong aversion to a monotonous environment. Recthlingshafer concluded that "habituation is the chief antagonist of novelty."³² Rensis claimed that "when jobs are excessively routine, the monotony and loss in satisfaction with the work seems to affect productivity adversely."³³ Perhaps this is one of the problems of concern to the "Pussycats," when they speak in terms of jobs having more intrinsic value to the individual.³⁴

Finally, a very pertinent factor that must be considered is the psychological problem of accurate measurement. Lindzey, in his experiments with pupils that seemed to lack initiative, or in plain terms seemed lazy, found that although they appeared to be apathetic externally, in their expression of ideas verbally and in writing, their minds were much more active than those of pupils that exhibited more overt behavior.

³² Ibid., p. 45.

³³ L. Rensis, New Patterns of Management (New York: McGraw-Hill Book Co., 1961), p. 17.

³⁴ L.L. Barber and D. MacLaren (Video Tape by B.Y. Card and Associates), University of Alberta, Edmonton, 1967.

Barber and MacLaren speak of systems analysis, a procedure that would provide the individual in the organization with some intrinsic involvement in his job. They also propose a National Information Bank which would be an accumulation of information on individuals. Both of these propositions are relevant to this study. The computerized National Information Bank theory pre-supposes accuracy of individual evaluation and seems to be opposed to the view held by many, for example, Sir Alec Clegg, that we cannot yet measure human achievement and ability with any degree of accuracy.

They came up "with the most novel ideas."³⁵ Bruner wondered whether in our evaluation techniques, we were having difficulty distinguishing "inarticulate genius from articulate idiocy, the first represented by the student who, by his operations and conclusions has a deep grasp of the subject but not much ability to say 'how it goes', in contrast to the student who is full of appropriate words but has no matching ability to use the ideas for which the words presumably stand."³⁶

Bernstein's³⁷ studies, related to the effects of language facility on achievement, indicate that students coming from homes or areas where the 'elaborate' language code is used have an advantage on tests over students coming from homes or areas where the 'restricted' language code is used. Although Regan,³⁸ using Bernstein's 'restricted and elaborate' language code theory did not find significant differences in the language experience of a sample of Alberta children, this factor is nevertheless an important one. Children with limited language experience may be at a disadvantage on tests.

³⁵ D. Rechlingshafer, op. cit., p. 45.

³⁶ J.S. Bruner, The Process of Education (Cambridge: Harvard University Press, 1962), p. 55.

³⁷ B. Bernstein, A Socio-Linguistic Approach to Social Learning, Penguin Survey of the Social Sciences (London: Penguin Books, 1965).

³⁸ B. Y. Card, J.O. Regan, W.D. Knill, W.B. Dockrell, School Achievement in Rural Alberta (University of Alberta, 1966), p. 65.

Difficulty in measuring human potential is further discussed by Mussen. Although his statements may sound exaggerated, the many-factor effect is implicit as in the following:

. . . At the age of six, when his Stanford-Binet I.Q. was at its lowest, he had chronic sinus, bronchial asthma, and was in bed twelve weeks. His father contracted T.B. and his mother had to go to work: these changes produced a vast reorganization at home. The school reports at this time noted that the boy was restless, sensitive and shy. In contrast, at age ten, when he scored 163, his father had recovered and was working again after a period of unemployment, his school adjustment had improved tremendously, and he was said to manifest 'marvelous concentration' at school.³⁹

Benson reports further evidence from studies done by the Federal Office of Education (U.S.A.) indicating that "creative ability is not identical with I.Q."⁴⁰

Sociological Factors

Sociological factors that affect achievement and ability test scores are the concern of many sociologists. James Coleman in his studies of adolescent peer sub-culture provided evidence that the norms and values shared by members of the adolescent group influence their predisposition towards school work. He reported that the general

³⁹ P.H. Mussen, The Psychological Development of the Child (Engle Cliffs, N.J.: Prentice-Hall, Inc., 1963), p. 51.

⁴⁰ C.H. Benson, Perspectives on the Economics of Education (Syracuse: Syracuse University Press, 1963), p. 286.

orientation of the adolescent society was towards non-academic activities.⁴¹ Research in Canada in this field by Knill,⁴² Zentner,⁴³ and Friesen provides evidence of the existence of a peer sub-culture. As concluded by Friesen, Canadian students seem to place more importance "on the long-run objectives of education than on the immediate goals of athletics and popularity."⁴⁴ The fact that the student sub-culture exists should make us cognizant of its possible influence and impact.

Other sociological studies document the importance of cultural orientation as a factor in achievement. Kluckholn⁴⁵ (U.S.A.), Kitchen⁴⁶

⁴¹ J. Coleman, The Adolescent Society (Glencoe, Illinois: The Free Press of Glencoe, 1961), p. 5.

⁴² Card, Knill, Regan, Dockrell, op. cit., p. 77.

⁴³ H. Zentner, "Parental Behavior and Student Attitudes Towards Further Training," Alberta Journal of Educational Research, 9:22, March, 1963.

⁴⁴ D. Friesen, "Value Climates in Canadian High Schools," Canadian Administrator, 4:3, October, 1966.

⁴⁵ F.R. Kluckholn, Variations in Value Orientations (Evanstan, Ill.: Row Patterson & Co., 1961).

⁴⁶ H. Kitchen, "Differences in Value Orientations," Canadian Administrator, 5:3, December, 1965.

(Newfoundland), and Card,⁴⁷ Jones,⁴⁸ Strong⁴⁹ and Knill⁵⁰ (Alberta), found that individuals from different cultures have a different attitude towards time, other people, and work in general. Kitchen found that the fisherman of Newfoundland had a "subject of nature" orientation as contrasted with a "mastery over nature" orientation of most people in our modern society.⁵¹ In an Albertan study, Strong, found that "there was significant association between low achievement orientation and being Indian or Metis."⁵² Religious affiliation, as pointed out by Trembley⁵³ (Quebec), is an important aspect of culture orientation.

⁴⁷ Card, Knill, Regan, Dockrell, op. cit.

⁴⁸ C. Jones, "Integration Setting and Need for Motivation." (unpublished Master's thesis, University of Alberta, Edmonton, 1965).

⁴⁹ M. Strong, "Social Class and Levels of Aspiration" (unpublished M.A. thesis, University of Alberta, Edmonton, 1963).

⁵⁰ Card, Knill, Regan, Dockrell, op. cit.

⁵¹ Kitchen, op. cit., p. 13.

⁵² Jones, op. cit., p. 13.

⁵³ J. Porter, The Vertical Mosaic (Toronto: University of Toronto Press, 1965), p. 169.

Class differences are also important as factors that influence achievement. Much of the work that has been done in Canada seems to substantiate the existence of a class structure. Porter has identified six social classes in Canadian society and has indicated how they differ in their attitudes toward child rearing, time orientation, person orientation, and work orientation.⁵⁴ Merton described a vicious circle that seems to be the plight of the lower class.⁵⁵ Lower class members have negative attitudes towards achievement in school, they drop out, and consequently continue in the lower class.

Warner concluded that teachers represent middle class values and attitudes, and enforce these values, attitudes, and manners in the schools. "They tend to treat pupils with different value orientations as slow or poor learners."⁵⁶ Jones pointed out that "family characteristics, place of residence, religion, ethnicity, and especially socio-economic status are positively correlated with achievement motivation."⁵⁷

Some of the writers on the subject of pupil evaluation have observed that there are different views on this subject in different countries. Goslin stated that "our tendency to put individuals into

⁵⁴ Ibid., p. 165.

⁵⁵ R.K. Merton, Sociology Today (New York: American Sociological Society, Basic Books Inc., 1959), p. 273.

⁵⁶ W.L. Warner, as cited by R.G. Corwin: A Sociology of Education (New York: Meredith Publishing Co., 1965), p. 182.

⁵⁷ Jones, op. cit., p. 24.

cubby holes, or into different tracks, at an earlier and earlier age," is interesting in the light of the open view of human intellectual capacity found in the Soviet Union.⁵⁸ He claimed that there "the point of view on inherent differences in abilities between individuals is that they do not exist except in cases of brain damage or similar physiological causes."⁵⁹ Differences in performance are attributed to motivational factors or to inequities in experience. Goslin cited Bronfenbrenner's reports showing that the system shifts the focus of educators to the motivation problem, and the generation of the student's desire to achieve. It may, however, be probable that motivation to educators in the Soviet Union means the same as ability in North America.

Swift reported that in the U.S.A. it is possible for the student to ignore serious study during his teen years and later decide to get an education. The student there "can find some school or college which will accommodate him and provide him with an opportunity to work his way not only upwards but across into the best universities of the world."⁶⁰ Swift further claimed that the weakness in the Canadian system seems to be that the "opportunity structure is so limited after

⁵⁸ Goslin, op. cit., p. 113.

⁵⁹ Ibid., p. 115.

⁶⁰ D. F. Swift, "A Sociologist Looks at Canadian Education: (A Presentation to the Canadian Research Seminar, June, 1964), p. 15. [Mimeo.]

eighteen and so dependent upon performance up to eighteen based on some or the more out of date aspects of intelligence testing ."⁶¹ This view was further substantiated by Porter when he said that "a society which refuses to remove barriers to educational opportunity is falling short of the democratic ideal."⁶²

III. SUMMARY

The barriers of attitudes and values, measuring techniques, boredom, emotional and physiological needs, organizational effects, in addition to the social barriers of inadequate income, family size, regional differences in educational facility, religion and ethnicity, are some of the factors that should be considered in the evaluation of achievement and ability.

It is not the purpose of this study to support any particular point of view. It is recognized that these views are not necessarily at variance with each other but are a part of the total research concern aimed at the problem of more accurate evaluation and prediction. The literature was presented here with a two-fold purpose. First it was intended to show that there is inconclusive evidence as to how much emphasis should be put on test scores as predictors. Hence it would be interesting to find out where principals in Alberta stand. Secondly this information was presented to show that administrators, who set policy in regard to

⁶¹Ibid., p. 15.

⁶²Porter, op. cit., p. 167.

the selection of pupils for the matriculation program, can be influenced in one direction or another. Depending on their views, principals in their selection policies can be ideographic, favoring consideration for the student, or nomothetic, being concerned about the organization and its goals.⁶³ Finally, school characteristics such as size, setting, and availability of alternate programs, and variations in the general intelligence of the pupils in the school may also affect the principals' decisions regarding the type of pupils they select for the matriculation program.

⁶³J.W. Getzel, and E.G. Guba, "Social Behavior and the Administrative Process" The School Review, 65:423-441, Winter, 1967.

CHAPTER III

THE METHOD OF THE STUDY - COLLECTION AND TREATMENT OF DATA

I. INTRODUCTION

This chapter outlines how the data for the study were collected and treated. A survey was first made to determine which Grade IX subject stanine scores are most extensively used by principals in Alberta schools as criteria to select students for the matriculation program. Additional information about hypothetical factors such as school size, setting, availability of alternate programs, consideration given by the principal to the requests of students and parents regarding the choice of program, standards set by the principal and his concern over the percentage pass in his school was also requested.

In addition to a one-way tabulation of the questionnaire data a cross tabulation of some of the responses was made. Chi-square was used to test relationships between standards suggested by the principals as the minimum for matriculation entrance and the general characteristics of the school including the degree of the principal's consideration for students' and parents' requests and the percentage pass in his school.

Finally, Departmental Grade IX stanine scores of students on the matriculation program in Grade X in 40 schools were obtained and the mean for each school was found. These means served as actual predictors of principals' selection practices under the assumption that high means are a result of more rigorous selection policies because students with low stanine scores would have been eliminated by the selection process.

Step-wise regression and analysis of variance were used to determine whether there were any significant relationships between the variations in means in the forty schools and variations in the hypothetical predictors.

II. THE SURVEY OF PRINCIPALS' SELECTION PRACTICES

Preparation of the Questionnaire and the Pilot Study

A questionnaire¹ was constructed to collect some of the data for this study. The first draft of the questionnaire that was prepared was evaluated by staff members from the Department of Educational Administration, ten principals of high schools in the province, and members of the Graduate Seminar. The questionnaire was then revised according to the submitted recommendations and suggestions.

Distribution of Questionnaires

All Alberta high schools listed by the Department of Education for 1966-1967 were included in the survey. The questionnaire was mailed to 340 principals in the province. A stamped self-addressed envelope was enclosed. Three weeks after the questionnaires were mailed, a follow-up letter² was sent to each principal who had not yet returned his questionnaire. An accurate check was kept using the code at the top of each questionnaire.

¹See Appendix A.

²See Appendix B.

Questionnaires were sent to all 340 high schools in the province. Twenty six private and special schools were eliminated from the study because the principals from these schools that answered the questionnaires reported special programs in Grade IX. Questionnaires from nineteen other schools were also eliminated from the study because the number of students in the high school grades was too small to warrant other than a partial matriculation program or because the principals from these schools did not answer the questionnaires completely. In all, 231 usable returns were received. These were representative of the 314 high schools in the province exclusive of private and special institutions. This constituted a 73.6 per cent return.

Organization of the Questionnaire Data

Section A of the questionnaire was concerned with the use made by principals of certain grade nine subject stanine scores, and the minimum stanine scores that are or should be used, in determining matriculation entrance. Section B of the questionnaire was concerned with the consideration given by the principal to the wishes of the students and the parents regarding the choice of program. Section C was concerned with the emphasis the principal placed on the percentage pass rating of his school as compared to other schools in the province. Sections D and E inquired about the general characteristics of the school, such as school size, setting, and the type of program offered. Finally, section F solicited additional comments by the principals.

III. DEPARTMENTAL STUDENT RECORDS AS ACTUAL PREDICTORS OF PRINCIPALS' SELECTION PRACTICES

The Sample

From the 231 schools for which questionnaire data were available a random stratified sample of 40 schools was drawn. Schools were divided into four size categories on the basis of the total high school population. Proportions in each size category were calculated and applied to the selection of the sample. Eighteen small, thirteen medium, six large and three very large schools were drawn from each of the size categories by using points of entry into tables of random numbers as outlined by Gourevitch³.

Collection of Additional Data From the Department

Grade X Registration forms on file with the Department for each student in Grade X in the forty schools in the sample were examined to determine which students were placed on the matriculation program in each school. Only students registered for the full complement of Grade X matriculation subjects (Mathematics 10, Science 10, Social Studies 10, English 10, and a Foreign Language 10) were considered as being on the matriculation program. After the names of all these students in each school in the sample were recorded, Grade IX Departmental Examination stanine scores for each student in Aggregate Achievement, Mathematics, Science and Verbal and Quantitative Scholastic Ability were obtained

³V. Gourevitch, Statistical Methods, A Problem Solving Approach (Boston: Allyn and Bacon Inc., 1965), p. 74.

from copies of the Grade IX marks sent by the Department to each school. Finally, Verbal and Quantitative Scholastic Ability Test stanine scores for all students in the schools, regardless of the program in which they were registered, were also recorded from the Departmental Grade IX records.

The Actual Predictors

The actual predictors of variations in the provision of opportunity to try the matriculation program in Alberta schools were variations in school Grade IX Aggregate Achievement, Mathematics, Science, and Scholastic Ability stanine score means of students on the matriculation program in Grade X for the year 1966-67.

Hypothetical Predictors

The hypothetical predictors were numerical measures of some of the factors that accounted for variations in school means of Aggregate Achievement stanine scores. School size, setting, availability of alternate programs, stanine scores accepted by principals as a minimum standard for entrance into the matriculation program, the degree the principal considered the wishes of the students and parents, the degree he was concerned over the percentage of students passing in Grade twelve, and the verbal and quantitative intelligence of all the pupils in the school, were the hypothetical factors tested to determine whether they contributed to the variance in the actual predictor.

VI. STATISTICAL TREATMENT OF DATA

Data From the Questionnaires

The answers of the principals were punched on I.B.M. cards and a one-way tabulation of the data from the 231 schools was made by means of a modification of the Datran Cross Tabulation computer program designed by Flathman.⁴ The results of this program were further checked by using the card sorter. A program of this kind facilitated the preparation of data for presentation in tabular form as in Chapter IV of this study. A cross tabulation and chi-square were used to test for relationships between minimum standards suggested by the principals and general factors that could affect their decisions.

The General Statistical Approach

A chi-square test was used to determine which factors significantly affected the variations in stanine score minimums for matriculation entrance suggested by the principals. The object of the procedure in the remainder of the study was to find from Grade X registration forms filed with the Department in September, which students, in a sample of 40 schools, had been permitted to try the matriculation program. From the Grade IX records of these students were obtained their stanine score standings in Aggregate Achievement, Mathematics, Science, and Verbal and Quantitative Scholastic Ability. The principals' responses to the questionnaires indicated which stanine scores were most extensively used as criteria for matriculation entrance. These stanine scores of students on the matriculation program in each school were averaged in order

⁴D. Flathman, Revised Cross 1, (University of Alberta, March, 1967).

to find the school mean in each of the above subject categories. The total Verbal and Quantitative Scholastic Ability stanine scores were also averaged to find the mean intelligence for all the students in each school regardless of the program in which the students were registered. This mean served as one of the hypothetical predictors.⁵

The means of schools of students on the matriculation program were then compared by analysis of variance to determine whether they differed significantly. Hypothetical variables such as school size, setting, program, I.Q. of all students in the school, standards set by the principal and consideration given to parents and students regarding choice of program were tested by step-wise regression to determine which of these variables contributed to significant variations between means. One-way analysis of variance was used to test the effects of variations in those variables that contributed significantly to the variance of school means of the criterion in the presence of other such variables.

Throughout the analysis the .05 level of significance was established for rejection of the null hypotheses.

Summary of Statistical Tests Used

For the analysis of the data four statistical procedures were used. These were chi-square, step-wise regression, analysis of variance, and correlations.

The chi-square test of independence was used to test seven of the seventeen hypotheses in this study. A cross-tabulation of two variables

⁵See p. 30.

was first made, and then the chi-square test was used to test for independence between them. The remaining ten hypotheses were tested using two approaches to analysis of variance. The step-wise approach made it possible to introduce hypothetical variables that could affect variations between means of the criterion one at a time until all variables were exhausted. Two ratios were calculated, an F value for the overall regression of two or three or more variables and a T value⁶ for the contribution of the last variable introduced into the regression model. This value of T was used to determine which variables did or did not contribute to variations in the criterion, depending on whether the T value obtained was above the predetermined critical value.

By means of one-way analysis of variance it was possible to test the contribution of variables, already established as significant by step-wise regression, to variations between means of the criterion in the presence of all other significant ones. Application of multiple linear regression, sometimes described as one-way analysis of variance, is outlined by Bottenberg and Ward,⁷ while step-wise regression is best described

⁶ In step-wise regression the T value showing contribution of individual variables is the same as an F ratio. Critical values of F tables were used to determine critical values of T. The T symbol is used to avoid confusion with the F values calculated for the partial regression given in the same program.

⁷ R.A. Bottenberg and J.H. Ward, Applied Multiple Linear Regression (Texas: Air Force Systems Command, Lackland Air Force Base, Texas), 1963.

by Draper and Smith.⁸

By means of the Pearson-product-moment correlations it was possible to find the relationship among scores in the Grade IX subject categories--Aggregate Achievement, Mathematics, Science, and Scholastic Ability. It was on the basis of these coefficients that Aggregate Achievement alone was chosen as the actual predictor.⁹

V. HYPOTHESES

Through the examination of the literature it was hypothesized in this study that consideration given by the principal to students' and parents' wishes regarding the choice of program and his concern over percentage pass in his school, as well as school characteristics such as size, setting, availability of alternate programs and the general intelligence of all the pupils in the school, would affect the matriculation standards set by the principal for matriculation entrance. The degree to which the principals' decisions were affected by the above factors would result in differences in the provision of opportunity to try the matriculation program from school to school. Two measures of the standards set in each school were available for the study, the minimum stanine score standards suggested by the principals in response to the questionnaire and the actual stanine score means in Aggregate Achievement, Mathematics, Science,

⁸ N.R. Draper and H. Smith, Applied Regression Analysis, (N.Y.: Wiley & Sons, N.Y., 1966), p. 171.

⁹ See p. 76.

and Scholastic Ability of pupils on the matriculation program in forty schools. The following hypotheses, divided on the bases of the above two measures of matriculation standards, and further classified on the bases of school characteristics and principal consideration were developed to guide the investigation.

Hypotheses Concerning the Standards Suggested by Principals and School Characteristics

1. School size is not significantly related to the standards suggested by the principals as minimum requirements for matriculation entrance.
2. School setting is not significantly related to the standards suggested by the principals as minimum requirements for matriculation entrance.
3. Availability of alternate school programs is not significantly related to the standards suggested by the principals as minimum requirements for matriculation entrance.

Hypotheses Concerning the Standards Suggested by Principals and Consideration for Students' and Parents' Requests and the School Percentage Pass

4. The degree of consideration given by principals to students' requests regarding the choice of program does not significantly affect principals' suggested standards for matriculation entrance.

5. The degree of consideration given by principals to parents' requests regarding the choice of programs for their children does not significantly affect the principals' suggested standards.

6. The degree of principals' concern over the percentage pass in the schools has no significant relationship with suggested standards.

Hypotheses Concerning Standards Suggested by Principals in the Different Grade Nine Subject Categories

7. There are no significant relationships among the minimum standards suggested by the principals for Grade IX Aggregate Achievement, Mathematics, and Science, and Scholastic Ability.

Hypotheses Concerning Standards as Reflected by Grade IX Stanine Score Means of Schools and School Characteristics

8. There is no significant relationship between variations in Grade IX Aggregate Achievement stanine score means of students on the matriculation program and variations in school size.

9. There is no significant relationship between variations in Grade IX Aggregate Achievement stanine scores means of students on the matriculation program and variations in school setting.

10. There is no significant relationship between variations in Grade IX Aggregate Achievement stanine score means of students on the matriculation program and variations in the availability of alternate programs.

11. There is no significant relationship between variations in Grade IX Aggregate Achievement stanine score means of students on the matriculation program and variations in the standards suggested by the principals.

Hypotheses Concerning Standards as Reflected by Grade IX Stanine Score Means and Principal Consideration for Students' and Parents' Requests and the School Percentage Pass

12. There is no significant relationship between variations in Grade IX Aggregate Achievement stanine score means of pupils on the matriculation program and variations in the degree of principals' consideration given to students' requests regarding choice of program.

13. There is no significant relationship between variations in school Grade IX Aggregate Achievement stanine score means of pupils on the matriculation program and variations in the degree of principals' consideration given to parents' requests regarding the choice of programs by their children.

14. There is no significant relationship between variations in school Grade IX Aggregate Achievement stanine score means of pupils on the matriculation program and variations in the degree of principals' concern over the percentage pass standing in their schools.

Hypotheses Concerning Standards as Reflected by Grade IX Stanine Score Means and Variations in Scholastic Ability

15. Variations in the Verbal Scholastic Ability means of all students in the school are not significantly related to variations in the Aggregate

Achievement stanine score means.

16. Variations in the Quantitative Scholastic Ability means of all students in the school are not significantly related to variations in Aggregate Achievement stanine score means.

Hypothesis Concerning the Relationship of Variations in all Hypothetical Predictors to Variations in Aggregate Achievement Stanine Score Means

17. Variations in school characteristics, the degree of principals' consideration for students' and parents' wishes regarding choice of program, the degree of principals' concern over the school percentage pass, variations in Scholastic Ability of all students in the school, and variations in standards set by principals are not significantly related to variations in the Aggregate Achievement stanine score means as actual predictors of principals' selection practices.

VI. SUMMARY

In this chapter the method of the study and the statistical approach were discussed. Data from the survey of principals' selection practices and additional data from the Department were used to determine whether there were any significant differences in the provision of opportunity to try the matriculation program in Alberta schools.

Minimum standards suggested by the principals and the actual Grade IX stanine score means of students on the matriculation program in Grade X were used as measures of entrance standards. Variations in factors such as school characteristics, standards suggested by principals, degree of

concern over the percentage pass in the schools were tested as hypothetical predictors in order to determine if variations in them had any significant relationship to variations in school means, and to further determine which of these hypothetical predictors were significantly responsible for this variance.

Seventeen hypotheses were formulated to guide the examination of these relationships.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA FROM THE SURVEY OF PRINCIPALS' SELECTION PRACTICES

I. INTRODUCTION

In this chapter the data from the survey of principals' selection practices is presented in tables. It was hoped that some of this information might be of some value to principals and therefore the summary of the consolidated findings of the survey is reported in detail. The analysis of the data includes an interpretation and discussion of the chi-square treatment of some of the responses showing relationship between different minimum standards suggested by the principals as criteria for the selection of students for the matriculation program and variations in general factors about which information was requested in the survey.

II. PRESENTATION AND DISCUSSION OF SURVEY DATA RELATED TO CHARACTERISTICS OF ALBERTA SCHOOLS

For the purpose of this study schools were divided into four size categories on the basis of the total Grade X-XII high school population reported by the principals. These size categories are an adaptation of categories established by Downey.¹ Category 1, includes small schools with a population of 1-99 high school students; category 2, medium schools with a population of 100-299; category 3, large schools with a pupil

¹L.W. Downey, The Small High School in Alberta (Edmonton: Alberta School Trustees' Association, 1965), p. 18.

population of 300-999; and, category 4, very large schools with a student population of over 1000. The frequency and percentage distribution of schools in the sample categorized by size appears in Table I.

TABLE I
DISTRIBUTION OF PUBLIC AND SEPARATE SCHOOLS BY SIZE
ACCORDING TO THE NUMBER OF PUPILS GRADE X-XII

Size Category	Frequency	Per Cent
1. Small	104	45.0
2. Medium	78	33.8
3. Large	32	13.9
4. Very Large	17	7.4
Totals	231	100

The schools were classified according to three environmental settings: schools situated in large urban areas with populations of 10,000 or more; schools situated in small urban areas with populations between 750 and 9,999; and rural schools, in areas totally rural or in small hamlets and villages with populations less than 750. The frequency and percentage distribution of schools in the sample on the basis of community setting is presented in Table II, page 42.

TABLE II
DISTRIBUTION OF SCHOOLS ACCORDING TO COMMUNITY SETTING

Setting Category	Frequency	Per Cent
1. Large urban	33	14.3
2. Small urban	87	37.7
3. Rural	111	48.1
Totals	231	100

Types of school programs offered in Alberta schools are presented in Table III. Although six types of programs were listed by principals, only four are presented here. General programs alone, and commercial and general programs were offered in very small schools. These schools were eliminated from the study.

TABLE III
DISTRIBUTION OF TYPES OF PROGRAMS OFFERED IN ALBERTA SCHOOLS

Type of Program	Frequency	Per Cent
1. Matriculation only	9	3.9
2. Matriculation and General	130	56.3
3. Matriculation, Technical and Commercial	59	25.5
4. Matriculation, General and Commercial	33	14.3
Totals	231	100

III. SURVEY DATA RELATED TO THE DEGREE OF USE OF STANINE SCORES
AND THE MINIMUM STANDARDS SUGGESTED BY PRINCIPALS

Tables IV to XI inclusive are concerned with the degree of use made of Grade IX stanine scores in the selection of pupils for the matriculation program and the suggested minimum standards for these stanine scores. Six questionnaires that did not have complete responses to the items necessary for analysis of variance were eliminated from the study along with the thirteen questionnaires from very small schools. Some of the remaining ones had unanswered questions. In instances

where part of the questionnaire was marked "not applicable" instead of the desired answer of "never," these responses were treated as if they had been answered and were included with the "never" category. In reply to other questions the numbers of responses to the particular question are indicated by the totals at the bottom of the table. The distribution of responses indicating the degree of use made by principals of Grade IX Aggregate Achievement stanine score appears in Table IV.

TABLE IV

DEGREE OF USE MADE OF AGGREGATE ACHIEVEMENT STANINE SCORES BY PRINCIPALS AS A CRITERION FOR MATRICULATION ENTRANCE

Degree	Frequency	Per cent
1. Always	42	18.2
2. Almost always	61	26.4
3. Frequently	76	32.9
4. In about half the cases	10	4.3
5. Seldom	31	13.4
6. Never	11	4.8
<hr/>		81.8
Totals	231	100

Aggregate Achievement stanine scores were used by 81.8 per cent of

the principals in about half or more of the cases as a criterion for selecting students for the matriculation program. The frequency and percentage distribution of minimum stanine scores suggested or used by the principals appears in Table V.

TABLE V

MINIMUM STANINE SCORES IN AGGREGATE ACHIEVEMENT USED OR
SUGGESTED BY PRINCIPALS

Stanine	1	2	3	4	5	6	7	8	9	Totals
Frequency	0	0	8	26	123	62	12	0	0	231
Per cent	0	0	3.5	11.3	53.2	26.8	5.2	0	0	100

Table VI, page 46, shows the distribution of principals' responses in relation to the degree of use made of Grade IX Departmental Mathematics and Science stanine scores.

TABLE VI

DEGREE OF USE MADE OF MATHEMATICS AND SCIENCE STANINE SCORES BY PRINCIPALS AS A CRITERION FOR MATRICULATION ENTRANCE

Degree	Frequency	Per Cent
1. Always	38	16.5
2. Almost always	73	31.6
3. Frequently	68	29.4
4. In about half the cases	14	6.1
5. Seldom	23	10.4
6. Never	15	6.4
 Totals	 231	 100

Grade IX Mathematics and Science stanine scores were used by 83.6 per cent of the principals responding in about half or more of the cases as criteria for matriculation entrance. Table VII, page 47, shows the frequency and percentage distribution of minimum Mathematics and Science stanine scores used or suggested by the principals.

TABLE VII

MINIMUM MATHEMATICS AND SCIENCE STANINE SCORES
USED OR SUGGESTED BY THE PRINCIPALS

Stanine	1	2	3	4	5	6	7	8	9	Totals
Frequency	0	1	3	30	137	49	10	1	0	231
Per cent	0	.04	1.3	13.0	59.3	21.2	4.3	.4	0	100

Table VIII, page 48, is a frequency and percentage distribution of the degree to which principals used Grade IX Scholastic Ability or I.Q. scores as a criterion for the selection of students for the matriculation program.

TABLE VIII

DEGREE OF USE MADE OF SCHOLASTIC ABILITY STANINE SCORE BY PRINCIPALS AS A CRITERION FOR MATRICULATION ENTRANCE

Degree	Frequency	Per cent
1. Always	27	11.7
2. Almost always	32	13.9
3. Frequently	83	35.9
4. In about half the cases	26	11.3
5. Seldom	47	20.3
6. Never	16	6.9
<hr/>		
Totals	231	100

Scholastic Ability scores were used by 72.8 per cent of the principals in about half or more of the cases as a criterion for the selection of students for the matriculation program. Table IX, on page 49, is a frequency and percentage distribution of minimum Scholastic Ability stanine scores used or suggested by the principals.

TABLE IX

MINIMUM SCHOLASTIC ABILITY STANINE SCORES
USED OR SUGGESTED BY PRINCIPALS

Stanine	1	2	3	4	5	6	7	8	9	Totals
Frequency 1	0	9	41	109	57	6	0	0	0	224
Per cent .4	0	3.9	17.7	44.6	23.8	2.6	0	0	0	100

Table X, page 50, presents the frequency and distribution of principals' responses regarding the degree of use made of an average of the Ability and Achievement stanine scores, while Table XI, page 50, shows the distribution of the used and suggested minimum stanine score average.

TABLE X

DEGREE OF USE MADE OF THE AVERAGE OF ABILITY AND ACHIEVEMENT STANINE SCORES BY PRINCIPALS AS A CRITERION FOR MATRICULATION ENTRANCE

Degree	Frequency	Per cent
1. Always	11	4.8
2. Almost Always	23	10.0
3. Frequently	66	28.6
4. In about half the cases	23	10.0
5. Seldom	62	26.8
6. Never	46	20.0
Totals		100

Of the principals responding 53.4 per cent reported using an average of Ability and Achievement stanine scores in about half or more of the cases as a criterion for matriculation entrance.

TABLE XI

MINIMUM AVERAGE ABILITY AND ACHIEVEMENT STANINE SCORE USED OR SUGGESTED BY PRINCIPALS

Stanine	1	2	3	4	5	6	7	8	9	Totals
Frequency	0	0	9	36	101	48	7	1	0	202
Per cent	0	0	3.9	13.6	50.0	26.3	3.0	.4	0	100

IV. SURVEY DATA RELATED TO PRINCIPALS' CONSIDERATION FOR STUDENTS' AND PARENTS' REQUESTS AND THE PERCENTAGE PASS

Tables XII to XV inclusive deal with students' and parents' wishes regarding the type of program that students should take. Table XII is a percentage and frequency distribution of the degree to which the principals considered the student's desire to register in a particular program.

TABLE XII
DEGREE OF PRINCIPALS' CONSIDERATION FOR STUDENTS'
WISHES REGARDING CHOICE OF PROGRAM

Degree	Frequency	Per cent
1. Always	30	13.0
2. Almost always	37	16.0
3. Frequently	77	33.3
4. In about half the cases	29	12.6
5. Seldom	51	22.5
6. Never	7	2.6
Totals	231	100

Of the principals responding 74.9 per cent indicated that they considered the students' wishes regarding the choice of programs to be undertaken.

Table XIII, shows the degree to which the principals considered the parents' desires to have their children in a particular program.

TABLE XIII

DEGREE OF PRINCIPAL'S CONSIDERATION FOR THE WISHES OF THE STUDENT'S PARENTS REGARDING CHOICE OF PROGRAM

Degree	Frequency	Per cent
1. Always	10	4.3
2. Almost always	11	4.8
3. Frequently	39	16.9
4. In about half the cases	25	10.8
5. Seldom	114	49.4
6. Never	32	13.8
<hr/>		
Totals	231	100

Only 36.8 per cent of the principals responding indicated consideration of the parents' wishes in about half or more of the cases; 63.2 per cent indicated they seldom or never considered the wishes of the parents.

Table XIV is a frequency and percentage distribution of principals' consideration for combined parent and student requests. It was intended that this question reveal some parent-student-principal liaison in regard to students' programs.

TABLE XIV

DEGREE OF CONSIDERATION FOR COMBINED WISHES OF PARENTS AND STUDENTS
REGARDING CHOICE OF PROGRAM

Degree	Frequency	Per cent
1. Always	25	10.8
2. Almost always	38	16.5
3. Frequently	70	30.3
4. In about half the cases	32	13.9
5. Seldom	60	26.0
6. Never	6	2.6
<hr/>		71.5
Totals	231	100

Of the principals responding 71.5 per cent stated that they considered the combined wishes of students and parents for a particular program in about half or more of the cases.

Finally, Table XV shows the frequency and percentage distribution of the degree of principals' concern over the percentage pass standing of their schools as compared to the percentage pass standing of other schools and the provincial pass average.

TABLE XV

DEGREE OF PRINCIPALS' CONCERN OVER PERCENTAGE
PASS STANDING IN THEIR SCHOOLS

Degree	Frequency	Per cent
1. Always	10	4.3
2. Almost always	11	4.8
3. Frequently	32	13.9
4. In about half the cases	5	2.2
5. Seldom	84	36.4
6. Never	89	38.5
<hr/>		<hr/>
Totals	231	100
<hr/>		<hr/>

Only 25.2 per cent of the principals responding indicated that they were concerned about the percentage pass standing of their schools; 74.8 per cent indicated that they seldom or never showed concern in this regard.

In response to Section F of the questionnaire, 63 principals out of the 231 respondents offered additional information. Expectancy charts² were used in some schools to inform students and parents of student chances of success in the matriculation program.

Some principals suggested consideration for the students' work habits, emotional stability and previous scholastic record in Grades I to VIII. Other principals reported using general test scores such as the Iowa Test of Basic Skills and the California Achievement to supplement Grade IX stanine scores. Grade IX Language stanine scores were also mentioned as a criterion.

V. ANALYSIS OF THE SURVEY DATA AND DISCUSSION OF THE RESULTS

The first seven hypotheses outlined in Chapter III were concerned with the relationships of school characteristics, certain principals' considerations and the stanine scores principals suggested as the minimum requirements for matriculation entrance. Chi-square was used to test the relationship between these variables.

Hypotheses Concerning the Standards Suggested by Principals and School Characteristics

Hypothesis Number One. The first hypothesis dealt with the relationship of variations in school size and variations in the standards

²See Appendix C.

suggested by the principals as minimum requirements for entrance into the matriculation program. Chi-square values, degrees of freedom, and critical values of the chi-square at the .05 level of significance, showing relationship between school size and the minimum standards suggested by the principals in Grade IX Aggregate Achievement, Mathematics and Science, and Scholastic Ability appear in Table XVI.

TABLE XVI

CHI-SQUARE VALUES SHOWING RELATIONSHIPS BETWEEN SCHOOL SIZE AND MINIMUM STANDARDS SUGGESTED BY PRINCIPALS

Minimum Standards	Chi-square Value	Degrees of Freedom	Critical Value of Chi-square
Aggregate Achievement	8.472	12	21.03
Mathematics and Science	7.647	18	28.87
Scholastic Ability	10.939	18	28.87

In all three instances the value of chi-square was below the critical value required at the .05 level of significance. Minimum stanine score standards suggested by the principals as minimum requirements for entrance into the matriculation program in Aggregate Achievement, Mathematics and Science, and Scholastic Ability were not significantly related to the size of schools.

Therefore the first null hypothesis stating that school size was not significantly related to the standards suggested by the principals was accepted.

Hypothesis Number Two. The second hypothesis stated that there were no significant relationships between the setting of the schools and the level of the standards suggested by the principals as minimum requirements for matriculation entrance. The results of the chi-square test showing the relationships between these variables appear in Table XVII.

TABLE XVII

CHI-SQUARE VALUES SHOWING RELATIONSHIPS BETWEEN SCHOOL SETTING
AND THE MINIMUM STANDARDS SUGGESTED BY THE PRINCIPALS

Minimum Standards	Chi-Square Values	Degrees of Freedom	Critical Value of Chi-Square
Aggregate Achievement	15.38	8	15.51
Mathematics and Science	6.817	12	21.03
Scholastic Ability	5.934	12	21.03

All three chi-square values were below the critical value of chi-square at the .05 level of significance. School setting did not appear to be related to the principals' opinions regarding standards for matriculation entrance.

The null hypothesis that school setting is not significantly related to the minimum standards suggested by principals as minimum requirements for matriculation entrance was accepted.

Hypothesis Number Three. The third hypothesis stated that there were no significant relationships between standards suggested by principals and the availability of alternate programs for students in the schools. The result of the chi-square test showing the relationship between standards set by the principals and availability of alternate programs is shown in Table XVIII.

TABLE XVIII

CHI-SQUARE VALUES SHOWING RELATIONSHIPS BETWEEN AVAILABILITY OF ALTERNATE PROGRAMS AND MINIMUM STANDARDS SUGGESTED BY PRINCIPALS

Minimum Standards	Chi-Square Value	Degrees of Freedom	Critical Value of Chi-Square
Aggregate Achievement	7.198	12	21.03
Mathematics and Science	11.909	18	28.87
Scholastic Ability	19.633	18	28.87

Chi-square values in all of the three Grade Nine subject categories were below the .05 level of significance. There were no significant relationships between availability of alternate school programs and the

standards suggested by the principals as minimum requirements for entrance into the matriculation program.

The null hypothesis was accepted.

Hypotheses Concerning the Standards Suggested by Principals, Consideration for Students' and Parents' Requests and Percentage Pass

Hypothesis Number Four. The fourth hypothesis stated that there were no significant relationships between the degree of consideration the principals gave to requests of students regarding choice of program and the standards they suggested as minimum for matriculation entrance.

The results of chi-square showing relationships between these variables appear in Table XIX.

TABLE XIX
CHI-SQUARE VALUES SHOWING RELATIONSHIPS BETWEEN CONSIDERATION GIVEN TO STUDENTS' REQUESTS AND MINIMUM STANDARDS

Minimum Standards	Chi-Square Value	Degrees of Freedom	Critical Value of Chi-Square
Aggregate Achievement	32.440	20	31.41
Mathematics and Science	53.52	30	43.77
Scholastic Ability	54.025	30	43.77

In all instances the chi-square values were above the critical value of chi-square at the .05 level of significance. The degree of consideration the principals gave to requests of students regarding choice of program was significantly related to the standards the principals suggested as minimum for matriculation entrance.

The null hypothesis was therefore rejected and the alternate hypothesis stating that the degree of principals' consideration for students' requests regarding choice of program was significantly related to the standards suggested by principals was accepted.

Hypothesis Number Five. The fifth hypothesis stated that the degree of principals' consideration for the requests of parents regarding the choice of programs by their children was not significantly related to the standards set by the principals for matriculation entrance. Chi-square values, degrees of freedom and critical values of chi showing the relationship between these variables are shown in Table XX, page 61.

TABLE XX

CHI-SQUARE VALUES SHOWING RELATIONSHIPS BETWEEN CONSIDERATION GIVEN TO REQUESTS OF PARENTS AND MINIMUM STANDARDS SUGGESTED BY PRINCIPALS

Minimum Standards	Chi-Square Value	Degrees of Freedom	Critical Value of Chi-Square
Aggregate Achievement	9.799	20	31.41
Mathematics and Science	20.157	30	43.77
Scholastic Ability	12.361	30	43.77

In all cases the values of chi-square were below the .05 level of significance that were required. Stanine scores suggested by the principals were not significantly related to the degree the principals considered the requests of parents regarding the choice of programs for their children.

The null hypothesis number five was accepted.

Hypothesis Number Six. Hypothesis number six stated that the degree to which the principals were concerned over the percentage pass in their schools was not significantly related to the standards they suggested as minimum for matriculation entrance. The results of chi-square showing relationship between these variables appear in Table XXI, page 62.

TABLE XXI

CHI-SQUARE VALUES SHOWING RELATIONSHIPS BETWEEN
PERCENTAGE PASS AND MINIMUM STANDARDS

Minimum Standards	Chi-square Value	Degrees of Freedom	Critical Value of Chi-Square
Aggregate Achievement	19.731	20	31.41
Mathematics and Science	21.419	30	43.77
Scholastic Ability	32.669	30	43.77

According to the above values of chi-square there were no significant relationships between principals' concern over percentage pass in the schools and the level of standards that they suggested as the required minimum for matriculation entrance.

The sixth null hypothesis was accepted.

Hypothesis Concerning Standards Suggested by the Principals in the
Different Grade IX Subject Categories.

Hypothesis number seven stated that there were no significant relationships among the minimum standards suggested by principals for matriculation entrance in Grade IX Aggregate Achievement, Mathematics and Science, and Scholastic Ability. Relationships among these variables are shown in Tables XXII, XXIII, and XXIV, on pages 63, 64, and 65.

TABLE XXII

CONTINGENCY TABLE SHOWING RELATIONSHIPS BETWEEN THE
SUGGESTED MINIMUM STANDARDS IN AGGREGATE ACHIEVEMENT AND
MATHEMATICS AND SCIENCE

		Mathematics and Science								
		Stanine	2	3	4	5	6	7	8	Totals
Aggregate Achievement	3	1	3	2	2	0	0	0	0	8
	4	0	0	14	12	0	0	0	0	26
	5	0	0	13	101	8	1	0	0	123
	6	0	0	1	21	36	3	1	1	62
	7	0	0	0	1	5	6	0	0	12
	Totals	1	3	30	137	49	10	1	1	231

The chi-square value showing relationship between the above variables was 306.64 with 24 degrees of freedom. The critical value of chi-square required for significance at the .05 level was 36.42. Minimum standards suggested by the principals in Aggregate Achievement and those suggested in Mathematics and Science were significantly related.

Relationships between Mathematics and Science and Scholastic Ability minimum stanine score standards suggested by the principals are shown in Table XXIII, page 64.

TABLE XXIII
CONTINGENCY TABLE SHOWING RELATIONSHIPS BETWEEN THE
SUGGESTED MINIMUM STANDARDS IN MATHEMATICS AND
SCIENCE, AND SCHOLASTIC ABILITY

		Mathematics and Science							Totals
		Stanine 1	2	3	4	5	6	7	
Scholastic Ability	2	0	1	0	0	0	0	0	1
	3	0	0	3	0	0	0	0	3
	4	0	0	4	18	5	2	0	29
	5	0	0	2	22	89	19	0	132
	6	0	0	0	1	12	34	1	48
	7	1	0	0	0	2	2	5	10
	8	0	0	0	0	1	0	0	1
	Totals	1	1	9	41	109	57	6	224

The chi-square value showing the relationship between the above variables was 528.49 with 36 degrees of freedom. The critical value of chi-square required for significance at the .05 level was 43.77. Minimum standards suggested by the principals in Mathematics and Science and Scholastic Ability were significantly related.

Relationships between Aggregate Achievement and Scholastic Ability minimum stanine score standards suggested by the principals are shown in Table XXIV.

TABLE XXIV

CONTINGENCY TABLE SHOWING RELATIONSHIPS BETWEEN
THE SUGGESTED MINIMUM STANDARDS IN
AGGREGATE ACHIEVEMENT AND SCHOLASTIC ABILITY

		Aggregate Achievement							Totals
Scholastic Ability	Stanine	1	2	3	4	5	6	7	
	3	0	1	4	2	0	1	0	8
	4	0	0	4	16	5	1	0	26
	5	0	0	1	23	81	13	0	118
	6	0	0	0	0	21	38	1	60
	7	1	0	0	0	2	4	5	12
Totals		1	1	9	41	109	57	6	224

The chi-square value showing relationship between the above variables was 285.51 with 24 degrees of freedom. The critical value of chi-square required for significance at the .05 level was 36.42. Minimum standards suggested by the principals in Aggregate Achievement and Scholastic Ability

were significantly related.

In all three instances the values of chi-square were well above the critical value required for significance at the .05 level of significance. The null hypothesis number seven stating that there were no significant relationships between the stanine score minimum standards suggested by the principals in Aggregate Achievement, Mathematics and Science, and Scholastic Ability as requirements for matriculation entrance was rejected, and the alternate hypothesis that there were significant relationships between these suggested standards was accepted. Principals, according to the above evidence, were quite consistent in the choice of standards in Grade IX subject categories. Those principals that suggested, for example, stanine six as a minimum standard in Aggregate Achievement also tended to choose the same standard in the other subject categories.

Summary of Findings Concerning Principals' Suggested Standards

By means of the chi-square tests it was shown that there were no significant relationships between school size, school setting and availability of alternate programs and the level of stanine score standards that the principals suggested as pre-requisite for matriculation entrance. Furthermore the degree of principals' consideration for the requests of parents regarding the choice of programs by their children was not significantly related to the level of standards suggested by principals. Also, the degree to which the principals were concerned over percentage pass was not significantly related to the standards they suggested as minimum for matriculation entrance.

According to the evidence, significant relationships were found among the levels of standards suggested by principals in each of the three Grade IX subject categories and between variations in consideration for students' requests and suggested standards. There were highly significant relationships among the standards suggested as minimum for matriculation entrance in Aggregate Achievement, Mathematics and Science, and Scholastic Ability.

VI. CHAPTER SUMMARY

It can be concluded from the principals' responses that Grade IX Aggregate Achievement, Mathematics and Science, and Scholastic Ability stanine scores are extensively used as criteria for matriculation entrance. Of the principals responding, 81.8 per cent reported that they used Aggregate Achievement stanine score as a criterion in about half or more of the cases; 83.6 per cent reported using Mathematics and Science stanine scores, and 72.8 per cent reported using Scholastic Ability stanine scores in about half or more of the cases as criteria for matriculation entrance. Average of Aggregate Achievement and Scholastic Ability stanine scores were reported used as criteria by only 53.4 per cent of the principals responding.

Minimum stanine scores suggested by principals as desirable ranged from about stanine 3 to stanine 8 in all the Grade IX subject categories. It seemed apparent that there was more concern over high standards in some schools than in others.

From the overall responses it was concluded, as hypothesized by Black³ and Nyberg,⁴ that Grade IX stanine scores were used extensively by principals to assign students to given high school programs.

By means of chi-square tests it was found that there appeared to be no relationship between school characteristics, consideration given by principals to parents' requests regarding choice of programs, degree of principals' concern over percentage pass and variations in standards suggested by principals as minimum requirements for matriculation entrance.

Principals were consistent in the choice of standards in all three Grade IX subject categories.

³See p. 11.

⁴V. Nyberg, "Changing Role of Examinations," Curriculum News Letter (Edmonton: Department of Education, Queen's Printer, Edmonton, 1966).

CHAPTER V

PRESENTATION, ANALYSIS AND DISCUSSION OF DEPARTMENTAL STUDENT RECORDS DATA REFLECTING PRINCIPALS' SELECTION PRACTICES

I. INTRODUCTION

In this chapter the combined data from Departmental student records reflecting principals' selection practices and from the questionnaires are presented and discussed. Grade IX stanine score means in five Grade IX subject categories of students on the matriculation program in Grade X, the number of students in Grade X in each school, the number selected for the matriculation program, and the means in Verbal and Quantitative Scholastic Ability for all students in Grade X, are presented in tables. Correlations showing relationships between stanine score means in the three Grade IX subject categories are also presented and discussed. The remainder of the chapter is concerned with tests for hypothesis 8-17 by step-wise regression showing the relationships between variations in the nine hypothetical predictors of principals' selection practices and variations in Grade IX Aggregate Achievement stanine score means as actual predictors of principals' selection practices.

II. SCHOOL GRADE NINE STANINE SCORE MEANS OF STUDENTS ON THE MATRICULATION PROGRAM IN GRADE TEN

An assumption was made in this study that Grade IX stanine score means of students on the matriculation program in Grade X would be good measures of principals' selection practices if some of the other measurable

variables that contributed to variations in these means were accounted for. Higher means would indicate more rigorous selection policy because students with low stanine scores would have been eliminated by the selection process. Tables XXV and XXVI, pages 71 and 72, present the following information: the total number of students in Grade X in each school in the sample; the number of students selected for the matriculation program in each school; Grade IX stanine score means in Verbal and Quantitative Scholastic Ability of all students in each school in the sample regardless of the program in which these students were registered; School Grade IX stanine score means of students on the matriculation program in Aggregate Achievement, Mathematics, Science, Verbal Scholastic Ability and Quantitative Scholastic Ability.

TABLE XXV

GRADE IX STANINE SCORE MEANS OF STUDENTS ON THE MATRICULATION PROGRAM IN VERY SMALL SCHOOLS

School Number	All Students in Grade X		Students on Matriculation Only					
	Number of Students in Grade X	Number of Students on Matriculation	Mean Verbal SCAT	Mean Quantitative SCAT	Mean Aggregate Achievement	Mean Mathematics	Mean Science	Mean Verbal SCAT
1	16	8	4.42	5.05	6.37	6.62	6.50	6.25
2	24	11	5.32	5.16	6.45	6.63	6.90	6.00
3	11	7	4.09	6.54	6.71	8.14	6.57	5.00
4	39	17	4.75	5.04	5.70	5.88	5.35	5.35
5	28	12	3.47	4.41	5.16	5.41	5.33	4.91
6	54	25	4.98	4.93	5.60	5.76	5.00	6.04
7	23	7	3.95	4.95	6.28	6.71	5.85	5.28
8	21	9	4.08	5.41	6.11	7.11	5.88	5.33
9	25	16	5.20	5.27	6.60	6.73	6.80	5.86
10	18	9	3.78	4.28	6.88	7.00	6.11	5.88
11	22	13	4.62	4.40	6.07	6.00	5.30	5.53
12	26	12	4.44	4.96	5.91	5.83	6.25	5.41
13	21	11	3.37	4.62	6.18	5.63	5.81	5.00
14	29	21	4.22	4.63	5.90	5.57	6.00	5.38
15	22	16	4.85	5.83	6.75	6.81	6.25	6.68
16	13	6	4.00	5.30	5.66	6.83	5.83	4.66
17	30	20	4.74	5.93	6.78	7.15	6.42	5.42
18	23	16	4.32	4.84	6.33	6.13	6.40	5.06

TABLE XXVI

GRADE IX STANINE SCORE MEANS OF STUDENTS ON THE MATRICULATION PROGRAM IN MEDIUM, LARGE, AND VERY LARGE SCHOOLS

School Number	All Students in Grade X			Students on Matriculation Only					
	Number of Students in Grade X	Number of Students on Matriculation	Mean Verbal SCAT	Mean Quantitative SCAT	Mean Aggregate Achievement	Mean Mathematics	Mean Science	Mean Verbal SCAT	Mean Quantitative SCAT
Medium Schools									
19	49	27	4.76	5.00	6.59	7.07	6.14	5.77	6.14
20	41	26	4.74	4.39	5.75	6.12	5.83	5.20	5.83
21	86	49	5.12	3.66	6.44	5.44	6.69	6.20	5.81
22	67	20	5.00	5.33	7.20	7.00	6.95	6.55	6.95
23	72	38	5.28	4.82	6.21	5.72	5.91	5.91	5.13
24	58	13	4.42	4.42	6.30	6.07	5.84	5.84	6.00
25	46	25	4.34	4.67	5.91	5.87	6.12	5.54	6.20
26	43	23	4.58	4.66	5.29	5.91	5.12	5.00	5.20
27	44	25	4.57	4.19	5.28	5.60	5.28	5.12	5.40
28	79	51	4.98	5.01	5.85	5.24	5.63	5.85	5.75
29	41	19	4.12	4.78	6.05	5.84	5.36	5.36	6.15
30	65	21	4.62	4.18	6.90	6.45	6.45	6.50	6.65
31	51	23	4.50	5.08	5.91	6.30	5.95	5.21	5.91
Large Schools									
32	176	57	4.66	5.60	6.70	6.59	6.43	6.50	6.82
33	160	67	4.92	4.77	6.16	5.76	5.89	6.11	5.92
34	142	47	4.34	4.47	5.76	5.48	5.29	4.95	5.46
35	172	42	4.25	4.10	6.19	5.73	6.14	6.26	6.07
36	174	86	5.27	5.26	6.70	6.36	6.63	6.55	6.53
37	172	78	5.21	4.98	6.29	5.93	6.85	6.07	6.29
Very Large Schools									
38	468	238	5.65	5.28	7.12	6.79	6.66	6.76	6.38
39	351	162	5.71	6.36	7.53	7.62	6.87	6.75	7.29
40	287	106	5.07	4.93	5.94	6.03	5.70	5.63	5.83

School Scholastic Ability stanine score means of all Grade X students ranged from a low of 3.37 to a high of 5.71 in Verbal Scholastic Ability, and from a low of 3.66 to a high of 6.54 in Quantitative Scholastic Ability. Grade IX subject stanine score means of students on the matriculation program ranged from a low of 5.16 to a high of 7.53 in Aggregate Achievement, from a low of 5.24 to a high of 8.14 in Mathematics, from a low of 5.00 to a high of 6.95 in Science, from a low of 4.66 to a high of 6.76 in Verbal Scholastic Ability, and from a low of 5.13 to a high of 7.29 in Quantitative Scholastic Ability. Table XXVII summarizes the information given in Tables XXV and XXVI for the sample of 40 schools.

TABLE XXVII

		All Students in Grade X		Students on Matriculation Only	
Number of Schools	Number of Grade X Students	Mean Verbal SCAT		Mean Aggregate Achievement	
	Number of Grade X Students on Matriculation	Mean	Quantitative	Mean	Mathematics
40	3289	1480	4.61	4.92	6.23
					6.27
					5.99
					5.47
					6.10

The Verbal Scholastic Ability stanine score mean for the total of 3289 students in the sample was 4.61, while the Quantitative Scholastic Ability stanine score mean for the 3289 students was 4.92.

Stanine score means for students on the matriculation program were 6.23 in Aggregate Achievement, 6.27 in Mathematics, 5.99 in Science, 5.47 in Verbal Scholastic Ability and 6.10 in Quantitative Scholastic Ability. If the sample used in this study was representative of the situation in Alberta schools, a point that is considered later in this chapter, Alberta students aspiring towards entrance into matriculation program would in general need a stanine rating of approximately 6 or better in the above subject categories.

Correlations Between Means in the Grade Nine Subject Categories

It was possible to test for the relationships of variations in the hypothetical predictors to variations in the actual predictors. That is, it was possible to test for relationships of variations in school characteristics, principals' consideration, principals' suggested minimum standards and Scholastic Ability, and the variations in Aggregate Achievement, Mathematics, Science, Verbal or Quantitative Scholastic Ability stanine score means of students on the matriculation program. However, repetition of the same analysis for five of the above subject categories would have been redundant if there were significant correlations among them. The consolidated findings of questionnaire data indicated that principals used Mathematics and Science stanine scores most frequently as criteria

for matriculation entrance. Mathematics and Science stanine scores were used by 83.6 per cent of the principals in half or more of the student cases. Aggregate Achievement stanine scores were used by 81.8 per cent of the principals in half or more of the student cases as criteria for matriculation entrance and Scholastic Ability stanine scores were used by 72.8 per cent of the principals responding in half or more of the student cases as criteria for matriculation entrance. Mathematics, Science and Aggregate Achievement stanine score means would have served best as actual predictors of selection practices because these stanine scores were most extensively used by principals to select students for the matriculation program. Scholastic Ability would have been less suitable because it was not used as extensively by principals and was thus not considered as the actual predictor. To avoid redundancy by repeating an analysis involving each of the subject category stanine score means, these stanine score means in Mathematics, Science, and Aggregate Achievement were correlated. Pearson-product moment correlation coefficients for the above are presented in Table XXVIII, page 76.

TABLE XXVIII

 PEARSON-PRODUCT MOMENT CORRELATION COEFFICIENTS SHOWING RELATIONSHIPS
 BETWEEN MATHEMATICS, SCIENCE, AND AGGREGATE
 ACHIEVEMENT STANINE SCORE MEANS

Subjects	r^a
Mathematics and Aggregate Achievement	.687 ^b
Science and Aggregate Achievement	.665
Science and Mathematics	.467

^aA value of .325 is required for significance at the .05 level.

^bAll correlations are significantly different from zero at the .01 level.

Since Mathematics, Science and Aggregate Achievement stanine score means of the schools in the sample were significantly correlated, and since higher correlations were found between Aggregate Achievement and each of Science and Mathematics, Aggregate Achievement stanine score means were chosen as the actual predictor.

II. TESTS FOR HYPOTHESES 8-16 SHOWING RELATIONSHIPS BETWEEN
VARIATIONS IN THE HYPOTHETICAL PREDICTORS AND THE VARIATIONS
IN THE ACTUAL PREDICTOR

Hypotheses 8-16 deal with the relationship of variations in school characteristics, in certain considerations by the principals, in differing principals' suggested stanine score standards, in the level of scholastic ability in the schools and variations in standards as reflected by Aggregate Achievement stanine score means of students on the matriculation program. Step-wise regression was used to test the relationship of variations in the above hypothetical predictors and variations in Aggregate Achievement stanine score means.

Step-wise regression tests for the relationships of variations in each hypothetical predictor and variations in the actual predictor. Hypothetical predictors were ranked from highest to lowest based on the degree of contribution to the variation in means of the actual predictor. A T-value was calculated indicating the significance of the contribution made by each individual hypothetical predictor introduced into the regression analysis. F and probability values were also calculated for the significance of the partial regression, that is the simultaneous contribution of two or three or more hypothetical predictors after each one was introduced into the regression. The T, F and probability values showing the relationship of variations in the hypothetical predictors and variations in the actual predictor are shown in Table XXVIX, page 78.

TABLE XXIX

T, F, AND PROBABILITY VALUES SHOWING RELATIONSHIPS OF VARIATIONS IN THE HYPOTHETICAL PREDICTORS AND VARIATIONS IN AGGREGATE ACHIEVEMENT STANINE SCORE MEANS

Hypothetical Predictors (Ranked)	Percentage Contribution to Variance			F Value Significance Level Probability		
	T Value	Significance Level				
	For Individual Variables				For Partial Regression	
Quantitative SCAT	10.28	.01	21.30	10.28	.01	.003
Verbal SCAT	4.80	.05	9.03	8.05	.01	.001
Principals' Suggested Standards	4.37	.05	7.54	7.31	.01	.001
• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •	• • • • •
Consideration for Students' Request	2.40	NS	3.99	6.30	.01	.001
Consideration for Parents' Requests	.26	NS	.44	4.99	.01	.001
Concern over Percentage Pass	.17	NS	.30	4.08	.01	.003
Setting	.08	NS	.14	3.41	.01	.007
School Programs	.01	NS	.01	2.89	.05	.015
School size	.001	NS	.001	2.49	.05	.029

Hypotheses Concerning the Relationships of Variations in School Characteristics and Variations in Grade IX Stanine Score Means

Hypotheses eight, nine and ten deal with the relationships of variations in school size, setting, and the availability of alternate programs and variations in Aggregate Achievement stanine score means. The T-values showing the relationship between these variables are presented in Table XXIX, page 78. They were .001, .08 and .01 respectively. Since these calculated values of T did not equal or exceed the critical values required for rejection of the null hypotheses, hypotheses number eight, nine, and ten were accepted.

Hypothesis Concerning the Relationship Between Principals' Suggested Standards and Aggregate Achievement Stanine Score Means

Initially, the general assumption in this study stated that standards set by the principals in different schools would vary and thus result in significant differences in school Grade IX stanine score means of students on the matriculation program. Aggregate Achievement stanine score means of students on the matriculation program would be greater in schools that had higher standards, because those students having low stanine score rating would have been eliminated by the selection process.

The eleventh hypothesis stated that there were no significant relationships between variations in the standards suggested by the principals and variations in the Grade IX stanine score means of schools as actual measures of principals' selection practices. The calculated value of T as presented in Table XXIX, page 78, was greater

than the critical value required for rejection of the null hypothesis. The null hypothesis was rejected and the alternate hypothesis that standards suggested by principals are significantly related to variations in Grade IX stanine score means was accepted.

Hypotheses Concerning Relationships Between Variations in Principals' Considerations and Variations in Aggregate Achievement Stanine Score Means

The twelfth, thirteenth and fourteenth null hypotheses concern the relationships of principals' considerations and variations in school Aggregate Achievement stanine score means. The T-values, as reported in Table XXIX, page 78, showing relationship between these variables were 2.40, .26, and .17. In all instances the value of T that was calculated did not equal or exceed the critical value required for rejection of the null hypotheses. Null hypotheses number twelve, thirteen and fourteen were accepted.

Hypotheses Concerning the Relationships Between Variations in Scholastic Ability and Variations in Aggregate Achievement Stanine Score Means

The fifteenth and sixteenth hypotheses concern the relationship of variations in Verbal and Quantitative Scholastic Ability in the schools and variations in Aggregate Achievement stanine score means of students on the matriculation program. The T-values, as reported in Table XXIX, page 78, showing relationships between these variables were 4.80 and 10.28.

Since both T-values exceeded the critical values of T that were required for rejection of the null hypotheses, hypotheses number fifteen and sixteen were rejected and the alternate hypotheses that variations in Verbal and Quantitative Scholastic Ability were significantly related to variations in school Aggregate Achievement stanine score means were accepted.

III. TEST FOR HYPOTHESIS SEVENTEEN SHOWING ACCUMULATIVE RELATIONSHIPS

The overall general hypothesis in this study stated that variations in school characteristics, considerations of principals, standards set by principals, and variations in scholastic ability in the schools were significantly related to variations in Aggregate Achievement stanine score means as actual predictors of principals' selection practices. The seventeenth null hypothesis stated that the relationship between the above variables was not significant. T-values showing the relationship of variations in each of the above hypothetical predictors and variations in the Aggregate Achievement stanine score means as the actual predictor are presented in Table XXIX, page 78. The F ratios and the probability of obtaining such variations in means by sampling error are given in the table for the accumulative contribution of the nine hypothetical predictors to variations in means of the criterion. The accumulative relationship of variations in two, three or more of the hypothetical predictors to variations in the actual predictor are discussed in this section.

Effects of Variations in Quantitative Scholastic Ability

Variations in this hypothetical predictor accounted for 21.30 per cent of the variations in the actual predictor. The F-value as presented in Table XXIX, page 78, showing this relationship was 10.28, significant at the .01 level of confidence. This hypothetical predictor was thus introduced first into the regression model because variations in this variable contributed most to variations in the actual predictor. Variables were then added one by one to determine an accumulative relationship of variations in them to variations in the actual predictor.

Accumulative Effects of Variations in Two Hypothetical Predictors

The F ratio and probability values calculated for the accumulative effects of variations in two hypothetical predictors (Quantitative and Verbal Scholastic Ability) and variations in Aggregate Achievement stanine score means were 8.05 and .001 respectively. The critical value of F required for significance at the .05 level was 5.26. The accumulative effects of variations in Verbal and Quantitative Scholastic Ability were significant at the .001 level. Variations in these hypothetical predictors accounted for 30.33 per cent of the variations in the actual predictor.

Accumulative Effects of Variations in Three Hypothetical Predictors

The F ratio and probability values calculated for the accumulative relationship of variations in three of the hypothetical predictors (Quantitative Scholastic Ability, Verbal Scholastic Ability and principals' suggested standards) and variations in Aggregate Achievement stanine score means were 7.31 and .001. The critical value of F required at the .05 level of significance was 4.38. Accumulative relationships of variations in the three hypothetical predictors were significant at the .001 level. Variations in these predictors accounted for 37.87 per cent of the variations in the actual predictor.

Accumulative Effects of Variations in all Nine Hypothetical Predictors

The F ratio and probability values calculated showing the relationship of variations in all of the nine hypothetical predictors (Quantitative Scholastic Ability, Verbal Scholastic Ability, principals' suggested standards, degree of principals' consideration for students' requests regarding choice of program, degree of principals' consideration for parents' requests regarding choice of program, degree of principals' concern over percentage pass, school setting, availability of alternate programs and school size) on variations in the actual predictor were 2.49 and .029. The critical value of F required for significance at the .05 level was 2.21. The effects of the variations in the nine hypothetical predictors on variations in the actual predictor were

significant at the .05 level. Variations in all the nine hypothetical predictors accounted for 42.75 per cent of the variations in the actual predictor. The added accumulative effect of the last six hypothetical predictors was only 4.88 per cent.

Null hypothesis number seventeen stating that variations in all the hypothetical predictors were not significantly related to variations in the actual predictor was rejected. An alternate hypothesis, stating that Grade IX Aggregate Achievement stanine score means of students on the matriculation program as the actual predictors of principals' selection practices vary in Alberta schools was related to (1) variations in Quantitative Scholastic Ability, (2) variations in Verbal Scholastic Ability, and (3) variations in standards set by principals as minimum requirements for matriculation entrance, was accepted.

This alternate hypothesis was further tested by one-way analysis of variance. The relationship of variations in principals' suggested standards and variations in Aggregate Achievement stanine score means was tested in the presence of the other two significant predictors. The F ratio, degrees of freedom and probability values indicating the relationship between variations in standards set by the principals and variations in Aggregate Achievement stanine score means when tested in the presence of the other two significant variables, Verbal and Quantitative Scholastic Ability, are presented in Table XXX, page 85.

TABLE XXX

ONE-WAY ANALYSIS OF VARIANCE SHOWING RELATIONSHIP BETWEEN
VARIATIONS IN STANDARDS SET BY PRINCIPALS AND VARIATIONS
IN STANINE SCORE MEANS

F ratio	Degrees of Freedom		Probability
	Numerator	Denominator	
11.7448 ^a	1	36	.001

^aA critical value of $F \geq 4.11$ was required for rejection of the null hypothesis.

The F and probability values calculated by one-way analysis of variance were 11.74 and .001. Variations in standards suggested by the principals were significantly related to variations in Aggregate Achievement stanine score means at the .001 level of significance when variation in Verbal and Quantitative Scholastic Ability were assumed constant.

IV. CHAPTER SUMMARY

An examination and analysis of the data obtained from the Department of Education indicated that school means in Aggregate Achievement, Science, Mathematics, and Scholastic Ability of students on the matriculation program differed in the 40 schools in the sample. Means in Aggregate Achievement ranged from a low of 5.29 to a high of 7.53. For Mathematics means ranged from 5.24 to 8.14, whereas for Science means ranged from 5.00 to 6.95. Verbal Scholastic Ability stanine

score means of students on the matriculation program ranged from 4.66 to 6.76, whereas Quantitative Scholastic Ability means ranged from 5.13 to 7.29.

Means for all of the students in the sample of 40 schools in Aggregate Achievement, Mathematics, Science, Verbal and Quantitative Scholastic Ability were 6.23, 6.27, 5.99, 5.47 and 6.10 respectively.

Correlation coefficients indicated a significant relationship between Mathematics, Science and Aggregate Achievement stanine score means. Therefore only the Aggregate Achievement stanine score means were chosen as the actual predictor.

Hypotheses concerning the relationships of variations in nine hypothetical predictors and variations in Grade IX Aggregate Achievement stanine score means were tested. The overall relationship of variations in all the hypothetical predictors and variations in the actual predictor was significant at the .05 level even when six of the nine hypothetical predictors did not contribute significantly to this variance. Only three hypothetical predictors were significantly related to variations in the actual predictor. Standards suggested by principals, Verbal Scholastic Ability stanine scores and Quantitative Scholastic Ability stanine scores were significantly related to variations in Aggregate Achievement stanine scores.

The relationship of variations in standards suggested by the principals and variations in Aggregate Achievement stanine scores was further tested by one-way analysis of variance in the presence of the

other two variables that significantly contributed to variance between means in Aggregate Achievement. A significant relationship was found between variations in standards as suggested by the principals and variations in the Aggregate Achievement stanine score means as the actual predictor of principals' selection practices.

CHAPTER VI

SUMMARY, CONCLUSIONS, IMPLICATIONS

I. INTRODUCTION

The purpose of this study was to survey selection for matriculation practices in Alberta schools in order to determine if they varied significantly from school to school. Data from the survey of principals' selection practices and additional data from the Department of Education reflecting principals' actual selection practices were analyzed. Seventeen hypotheses concerning variations in the opportunity to try the matriculation program were tested in order to determine which hypothetical factors caused variations in the required standards set by principals for matriculation entrance.

II. SUMMARY

The results of the analysis of the data are summarized in four sections. The first section is concerned with findings from the survey of principals' selection practices. The second section is concerned with the findings, by means of the chi-square tests for the first seven hypotheses, showing the relationship of variations in school characteristics, principals' considerations and variations in principals' suggested stanine score standards. The findings from the survey of Departmental records reflecting principals' actual selection practices is discussed in the third section. Finally, the results of the analysis of the combined data

from the Department and the questionnaires, including the results of tests for the remaining ten hypotheses, is summarized in the last section.

Summary of the Data From the Survey of Principals' Selection Practices

From the principals' responses to the questionnaire it was found that Aggregate Achievement, Mathematics and Science, and Scholastic Ability stanine scores were used extensively by principals as criteria for the selection of students for the matriculation program. Of the principals responding, 81.8 per cent reported using Aggregate Achievement stanine scores, 83.6 per cent using Mathematics and Science stanine scores, and 72.8 per cent using Scholastic Ability stanine scores as criteria for matriculation entrance.

Aggregate Achievement stanine scores suggested as the minimum standards for matriculation entrance were as follows: stanine 3 by 3.5 per cent of the principals; 4 by 11.3 per cent; 5 by 53.2 per cent; 6 by 26.8 per cent; and 7 by 5.2 per cent. That is, 80 per cent of the principals suggested a minimum stanine standard of 5 or 6.

The percentage of principals using varying stanine grades as minimum for matriculation entrance in Mathematics and Science were as follows: stanine 2 by .4 per cent; 3 by 1.3 per cent; 4 by 13.0 per cent; 5 by 59.3 per cent; 6 by 21.2 per cent; 7 by 4.3 per cent; and 8 by .4 per cent. Stanine scores 5 and 6 were suggested by 80.5 per cent of the principals as minimum standards in Mathematics and Science.

The percentage of principals suggesting varying stanine grades as minimum standards for matriculation entrance in Scholastic Ability were as follows: stanine 1 by .4 per cent; stanine 3 by 3.9 per cent; stanine 4 by 17.7 per cent; 5 by 44.6 per cent; 6 by 23.8 per cent; and 7 by 2.6 per cent. Scholastic Ability scores 5 and 6 were suggested by 74.1 per cent of the principals as minimum requirements for matriculation entrance.

Stanine scores 5 and 6 were generally common in Aggregate Achievement, Mathematics and Science, and Scholastic Ability, consequently Aggregate Achievement was chosen as the only actual predictor.

Principals' consideration for students' requests regarding the choice of programs was reported as follows: always, by 13.0 per cent of the principals; almost always, by 16.0 per cent; frequently, by 33.3 per cent; in about half the cases, by 12.6 per cent; seldom, by 22.5 per cent; and never, by 2.6 per cent. Only 25.1 per cent of the principals indicated that they seldom or never considered the requests of students regarding choice of programs.

Principals' consideration for parents' requests regarding the choice of programs by their children was reported as follows: always, by 4.3 per cent of the principals; almost always, by 4.8 per cent; frequently, by 16.9 per cent; in about half the cases, by 10.8 per cent; seldom, by 49.4 per cent; and never, by 13.8 per cent. Of the principals reporting 63.2 per cent stated that they seldom or never considered the requests of parents regarding the choice of programs by their children.

Finally, principals' concern over percentage pass in the schools was reported as follows: always, by 4.3 per cent; almost always, by 4.8 per cent; frequently, by 13.9 per cent; in about half the cases, by 2.2 per cent; seldom, by 36.4 per cent; and, never, by 38.5 per cent. Of the principals reporting, 74.9 per cent stated that they seldom or never were concerned over the percentage pass in the school

Principals' considerations for student requests regarding choice of program appeared to be significantly related to the standards suggested by the principals.

Summary of Relationships Between School Characteristics, Principals' Considerations, and Suggested Minimum Stanine Standards

By means of the chi-square tests of independence it was shown that there appeared to be no relationship between variations in school size, setting, and availability of alternate programs and variations in suggested standards in Aggregate Achievement, Mathematics and Science, and Scholastic Ability. Neither did the degree of principals' consideration for parents' wishes regarding choice of program, nor the degree of principals' concern over percentage pass in the school, appear to have any significant relationship to variations in the minimum stanine standards suggested by the principals.

The relationship between the level of standards suggested in Aggregate Achievement, Mathematics and Science, and Scholastic Ability was shown to be significant. Chi-square values much above the required critical value were obtained.

Summary of Findings from the Survey of Departmental Records Reflecting Principals' Selection Practices

An examination of the data from the Department of Education indicated that school means in Aggregate Achievement, Mathematics, Science, and Scholastic Ability of students on the matriculation program differed from school to school. Means in Aggregate Achievement ranged from a low of 5.16 to a high of 7.53; in Mathematics from 5.24 to 8.14; in Science from 5.00 to 6.95; in Quantitative Scholastic Ability from, 5.13 to 7.29; and, in Verbal Scholastic Ability from 4.66 to 6.76.

Means for the sample of 40 schools in Aggregate Achievement, Mathematics, Science and Verbal and Quantitative Scholastic Ability were 6.25, 6.27, 5.99, 5.47 and 6.10 respectively. Correlation coefficients revealed significant relationships between Mathematics, Science, and Aggregate Achievement stanine score means of students on the matriculation program. When the remaining ten hypotheses concerning the relationship of variations in Aggregate Achievement stanine score means were tested, it was found that variations in only three of these hypothetical predictors were significantly related to variations in the actual predictor. These were, Verbal and Quantitative Scholastic Ability scores, and minimum standards set by principals.

The overall relationship of variations in all the hypothetical predictors and variations in the actual predictor were significant at the .05 level even when six of the nine hypothetical predictors did not contribute significantly to this variance.

III. CONCLUSIONS

This study was a general approach to a complicated problem. First, there was no documentary evidence available indicating the extent to which stanine scores were being used by principals as criteria for matriculation entrance; neither was there any evidence indicating which stanine scores were being used by principals. Furthermore, it was difficult to measure such variables as, for example, the degree of principals' considerations for students' requests regarding the choice of program. The greater part of this study was a survey of principals' selection practices, what they said they did, and what they actually did, as reflected by the recorded Grade Nine stanine scores for students on the matriculation program in Grade X.

The following specific conclusions are derived from this study:

1. Alberta students aspiring to enter the matriculation program are likely to have this opportunity if they obtain a general stanine rating of 6 or better in Grade IX.
2. It was found that principals were not in agreement as to the standard that should be set as a minimum for matriculation entrance. Some suggested high standards as requirements for matriculation entrance while others suggested lower stanine standards.
3. Variations in school means as measures of principals' actual selection practices in Aggregate Achievement of students on the matriculation program in Grade X are significantly related to the variations in Scholastic Ability in schools and to varying standards set by principals.

4. Opportunity to try the matriculation program appears to vary from school to school in Alberta due to variations in minimum standards set by the principals and due to differences in the Scholastic Ability of students.

5. The consolidated findings from the questionnaire revealed that Aggregate Achievement, Mathematics, Science and Scholastic Ability stanine scores were extensively used as criteria for the selection of students for the matriculation program.

6. There were significant correlations between stanine score means in Aggregate Achievement, Science and Mathematics. This finding is not surprising in the light of the highly significant relationship found among stanine scores suggested by the principals as minimum standards. In fact, it substantiates the interrelationship of suggested standards and actual standards as reflected by school stanine score means.

7. Principals were consistent in their choice of minimum standards in the Grade Nine subject categories. There was a highly significant relationship among the levels of stanine standards suggested in Aggregate Achievement, Mathematics and Science, and Scholastic Ability.

8. Significant relationships were found between variations in the degree of principals' consideration for students' requests regarding the choice of program. No significant relationships were found between variations in the degree of principals' consideration for parents' requests regarding choice of program, and the degree of principals' concern over percentage pass in the schools and variations in the suggested standards.

9. No significant relationships were found between variations in school size, school setting, and the availability of alternate programs and variations in stanine scores suggested as minimum standards for matriculation entrance.

IV. IMPLICATIONS

Some of the findings in this study have specific implications for the general manpower situation in the province. It is implied in the findings that the general level of standards for entrance into the matriculation program set by principals may be too high. This may effect the supply of professionals because many students who possibly could be successful in certain careers are being eliminated by current selection practices.

The finding that opportunity to try the matriculation program depends on the level of the standards set by the principals has implications for administrative practices. Some principals, for reasons which did not become evident in this study, set higher standards than others. Perhaps a uniform policy across the province would have some merit.

The finding that there are significant variations in the level of Scholastic Ability in the schools may be of interest to both educators and sociologists. The reasons for these variations may require investigation.

V. RECOMMENDATIONS

As this study was concerned only with the year 1966-67, a longitudinal study of this nature over a period of years could yield more significant results. It would be of interest to know whether selection standards in a school remain constant from year to year under the same principal.

The causes of variations in principals' standards did not become evident in this study. More research is needed to establish why it is that standards set by principals vary from school to school.

It would be of interest to know why there are significant differences in the levels of Scholastic Ability among schools. Are the causes of these differences sociological and psychological, or are they related to the type of instruction give in the schools?

BIBLIOGRAPHY

BIBLIOGRAPHY

BOOKS

Argyris, C. Personality and the Organization. New York: Harper & Row, 1957.

Benson, C.H. Perspectives on the Economics of Education. Syracuse: Syracuse University Press, 1963.

Bernstein, B. A Socio-Linguistic Approach to Social Learning: Survey of the Social Sciences. London: Penguin Books, 1965.

Bruner, J.S. The Process of Education. Cambridge: Harvard University Press, 1962.

Card, B.Y. and others. School Achievement in Rural Alberta. Edmonton: University of Alberta, 1966.

Coleman, J. The Adolescent Society. Glencoe: The Free Press of Glencoe, 1961.

Draper, N. and Smith, H. Applied Regression Analysis. New York: Wiley and Sons, 1966.

Downey, L.W. The Small High School in Alberta. Edmonton: Alberta Trustees' Association, 1965.

Ferguson, G.A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill Book Co., 1963.

Flavell, J.H. The Developmental Psychology of Jean Piaget. Princeton: Van Nostrand Co., 1963.

Goslin, D.A. The School in Contemporary Society. Chicago: Scott Foresman & Co., 1965.

Gourevich, V. Statistical Methods. Boston: Allyn and Bacon Inc., 1965.

Maslow, A.H. Motivation and Personality. New York: Harper and Brothers, 1954.

McKinnon, F. The Politics of Education. Toronto: University of Toronto Press, 1960.

Merton, R.K. Sociology Today. New York: American Sociological Society. Basic Books, 1959.

Mussen, P.H. The Psychological Development of the Child. New Jersey: Prentice-Hall, 1963.

Porter, J. The Vertical Mosaic. Toronto: University of Toronto Press, 1965.

Rechlingshafer, D. Motivation as Related to Personality. New York: McGraw-Hill Book Co., 1961.

PERIODICALS

Black, D.B. "A Study of the Relationship of the Grade IX Principals Rating to Performance on the Alberta Departmental Examinations," Alberta Journal of Educational Research, 4:227-36, December, 1958.

Black D.B. "The Prediction of University Freshman Success Using Grade IX Departmental Examination Scores," Alberta Journal of Educational Research, 5:229-39, December, 1959.

Bolton, F.D. "Value of Vocational Aptitude Test Battery for Predicting High School Achievement," Personnel and Guidance Journal, 42:280-284, November, 1963.

Doplet, J.E., Seashore, H.S., Odgers, J.S. "Validation of the Differential Aptitude Tests for Auto Mechanics and Machine Shop Students," Personnel and Guidance Journal, 37:648-55, May, 1959.

Dunlop, G.M., Hunka, S., Zingle, H. "Individual Differences in Alberta Schools," Alberta Journal of Educational Research, 1:5-14, December, 1955.

Edmonton Journal, January 6, 1967.

Friesen, D. "Value Climates in Canadian High Schools," Canadian Administrator, 4:2-4, October, 1966.

Getzel, J.W., Guba, E.G. "Social Behavior and the Administrative Process," The School Review, 65:423-441, Winter, 1967.

Kitchen, H. "Differences in Value Orientations," Canadian Administrator, 5:2-13, December, 1965.

Knowles, D.W. "Problems of Admissions," Alberta Journal of Educational Research, 11:3-16, March, 1965.

Lewis, J. "Utilizing the Step-wise Multiple Regression Procedure in Selecting Predictor Variables by Sex Group," Educational and Psychological Measurement, 22:401-04, 1962.

Miller, F.D. "Public Relations in Business and Industry: Implications for Education," School Community Relations: Projects in Canadian School Administration, University of Alberta, 31-45, 1963.

Motte, J.J. "Interest Scores in Predicting Success in Vocational School Programs," Personnel and Guidance Journal, 37:674-76, May, 1959.

Nemzek, C.L., De Heus, J.H. "The Prediction of Academic and Non-Academic Marks in Junior High School," School and Society, 50:670-72, 1939.

Nyberg, V. "Changing Role of Examinations," Curriculum News Letter, 22:1-6, October, 1966.

Ross, C.C., Hooks, N.T. "How Shall We Predict High School Achievement?" Journal of Educational Research, 22:184-95, 1930.

Swanson, E.D. "Predicting High School Success in Technical College," Educational and Psychological Measurement, 21:1001-10, 1951.

Wesman, A.C., Bennet, G.K. "Simple Addition of Scores in Prediction of College Grades," Educational and Psychological Measurement, 19:243-46, 1959.

Zentner, H. "Parental Behavior and Student Attitudes Towards Further Training," Alberta Journal of Educational Research, 9:22-30, March, 1963.

UNPUBLISHED MATERIALS

Black, D.B., Ulmer, H. "The Value of the Grade IX Departmental Examinations in Predicting Success at the Grade XII Level." Unpublished Master's thesis, University of Alberta, Edmonton, 1950.

Evans, K.L. "The Academic History of the 1945 Grade IX Class in Their Subsequent High School Careers." Unpublished Master's thesis, University of Alberta, Edmonton, 1953.

Jones, C. "Integration Setting and Need for Motivation." Unpublished Master's thesis, University of Alberta, Edmonton, 1965.

MacInnis, M.J. "The Guidance Value of the Grade IX Departmental Scores and Other Selected Factors in Relation to Matriculation of Composite High School Students." Unpublished Master's thesis, University of Alberta, 1958.

Moysa, W. "A Study of the Comparative Value of Prediction Tests Administered in the University High School." Unpublished Master's thesis, University of Alberta, Edmonton, 1953.

Newland, E.F. "A Study of the Factors Relating to High School Success or Failure." Unpublished Master's thesis, University of Alberta, May, 1933.

Swift, D.F. "A Sociologist Looks at Education." A Presentation to the Canadian Research Seminar, Banff, Alberta, June, 1964. [Mimeo].

Wagner, W.P. "An Evaluation of Selected Tests as Predictors of Success in Industrial Arts." Unpublished Master's thesis, University of Alberta, Edmonton, 1951.

APPENDIX A
PRINCIPALS' SELECTION PRACTICES SURVEY
QUESTIONNAIRE

QUESTIONNAIRE No. _____

Note: Circle ONE number for each item

A. IN DECIDING WHICH STUDENTS SHOULD BE PERMITTED TO ENTER THE MATRICULATION OR UNIVERSITY ENTRANCE PROGRAM:

1. (a) do you use the Grade Nine Departmental examination aggregate achievement stanine score?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

(b) what do you accept (and, if you do not use this method, what would you accept) as the minimum achievement stanine score for the student?

STANINE 1 2 3 4 5 6 7 8 9

2. (a) do you use Grade Nine Departmental examination Mathematics and Science achievement stanine score?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

(b) what do you accept (and, if you do not use this method, what would you accept) as the minimum stanine score?

STANINE 1 2 3 4 5 6 7 8 9

3. (a) do you use the Grade Nine Departmental Verbal and Quantitative Scholastic Ability Test stanine score?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

(b) what do you accept (and, if you do not use this method, what would you accept) as the minimum stanine score?

STANINE 1 2 3 4 5 6 7 8 9

4. (a) do you use an average of the ability and achievement stanine score?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

(b) what do you accept (and, if you do not use this method, what would you accept) as the minimum stanine score?

STANINE 1 2 3 4 5 6 7 8 9

B. 1. Do you consider the wishes of the student when the student's stanine scores are lower than what you think desirable for success in the matriculation program?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

2. Do you consider the wishes of the parent alone when the student's stanine scores are lower than you think desirable for success in the matriculation program?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

3. Do you consider both the wishes of the student and of the parent when the student's stanine scores are lower than what you think desirable?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

C. Do you consider the percentage pass standing of your school as compared to other schools or the provincial average when you select students for the matriculation program?

1. Always	4. In about half the cases
2. Almost always	5. Seldom
3. Frequently	6. Never

D. Your school offers (including correspondence courses where they apply):

1. Matriculation program only	4. Matriculation, Technical and Commercial programs
2. General program only	5. General and Commercial programs only
3. Matriculation and General program only	

E. 1. Your school is located in:

- (a) an urban center having a population of 10,000 or more?
- (b) an urban center having a population of not less than 750 and not more than 9,999?
- (c) a rural setting in which the hamlet or town, if any, has a population of 749 or less?

2. Your high school enrolment (Grades X, XI, XII) is _____?

F. List additional criteria and any comments that you wish to make on the opposite side of this sheet.

APPENDIX B

LETTERS WRITTEN TO THE PRINCIPALS

14328-106B Avenue,
Edmonton, Alberta,
March 3, 1967.

Dear Principal:

As part of my graduate program at the University of Alberta I have undertaken a study of the criteria used to decide which students should be permitted to enter the matriculation or University entrance program. My research project has been approved by the Department of Educational Administration.

I would be most appreciative if you would answer the following questions and return the questionnaire part of this letter to me at your earliest convenience. A self-addressed envelope is enclosed. Your responses will be treated as confidential and only the consolidated findings will be reported.

I thank you in advance for your time and effort.

Yours sincerely,

Henry R. Golan

14328 - 106B Avenue,
Edmonton, Alberta,
March 31st, 1967.

Dear Colleague:

May I take this opportunity to thank you for your cooperation in a study of the criteria used to decide which students should be permitted to enter the matriculation or University entrance program in Alberta

If you have not yet mailed the questionnaire you received, may I ask you to do so within the next few days. Let me assure you that your reply is of significance in this study. Please use the stamped, self-addressed envelope which you received.

Yours sincerely,

Henry R. Golan.

APPENDIX C
EXPECTANCY CHARTS USED BY PRINCIPALS

EXPECTANCY CHART USING TOTALS OF STANINE SCORES

Total of Stanines	Chances in 100 of making a Grade 12		
	Matriculation Pass	Diploma Pass	Neither
50 - 54	100		
45 - 49	77	18	5
40 - 44	44	38	18
35 - 39	23	47	30
30 - 34	8	34	58
25 - 29	3	19	78
20 - 24		4	96
15 - 19			100
0 - 14			100

EXPECTANCY CHART USING MATHEMATICS STANINE SCORES

Mathematics Stanines	Chances in 100 of making a Grade 12		
	Matriculation Pass	Diploma Pass	Neither
9	90	10	
8	62	28	10
7	40	40	20
6	20	42	38
5	11	30	59
4	4	13	83
3			100
2			100
1			100



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